JUL 13 1922

PUBLIC WORKS

CITY COUNTY STATE

Harvester Road, St. Charles, Mo.
"Tarvia-X," 1920

Below: Typical spring condition of a soft surfaced road.

Carthage-Antwerp Road, N. Y.
Another Tarvia Highway

Tarvia transforms old-fashioned mud roads into all-year mudless, dustless highways—

PRESIDENT HARDING recently declared that the problem of distribution "is one of the greatest economic problems, if not the greatest problem, of modern civilization."

When we realize that it costs from four to ten times as much to haul a ton of goods over bad roads as it does over good roads, we see at once how vital this road problem is to all of us.

The question no longer should be, "Shall we have good roads?" It should be, instead, "How *quickly* and how *cheaply* can we get good roads?"

The Road Commissioners of hundreds of towns and rural districts throughout the country have found from experience that Tarvia pavements are the most economical good roads it is possible to build.

In first cost a Tarvia road is only slightly more than plain waterbound macadam. The upkeep of Tarvia pavement is, all things considered, so much less than that of any other type of lasting road that the saving—over a short period of years—will offset the original cost of construction.

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An annual temperature fluctuation of 100 degrees will cause 100 yards of concrete to expand or contract nearly two inches, enough to cause the destruction of this road if expansion allowance were not made.

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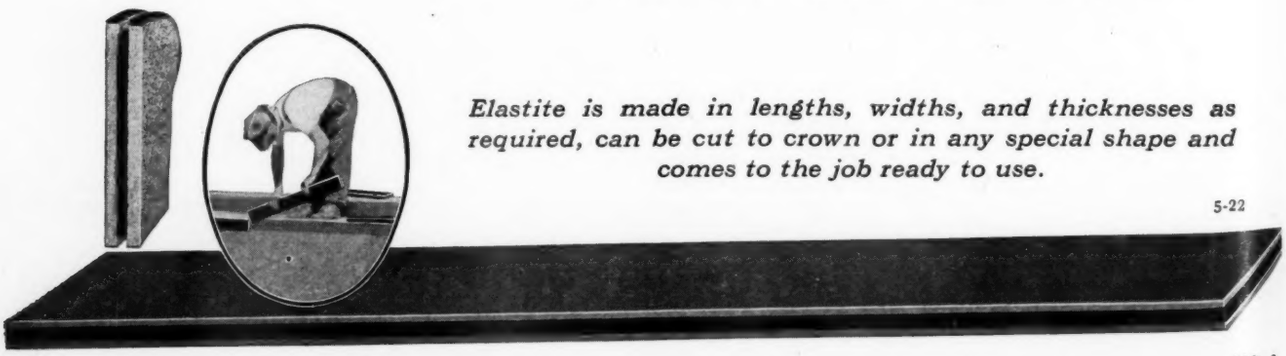

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5-22

VOL. 53 NO. 2
Entered as second-class matter at the Post Office, at New York, N. Y., November 22, 1921, under the Act of March 3, 1879.
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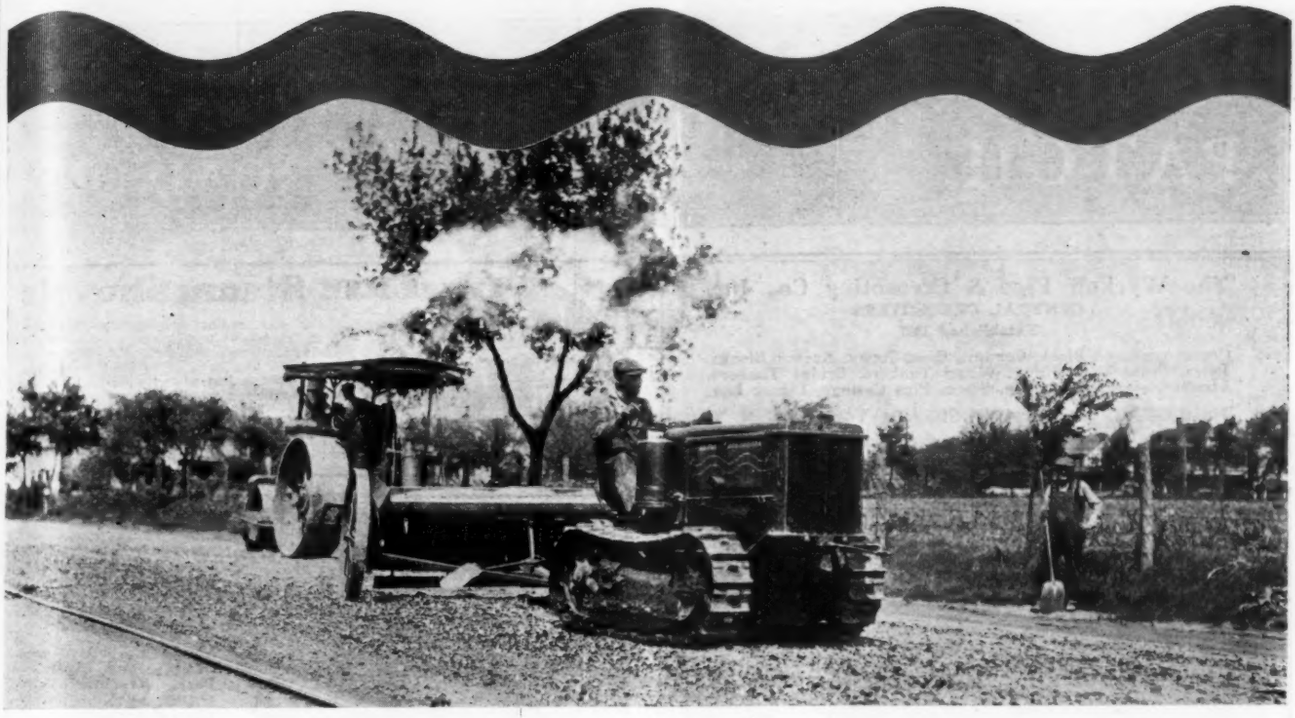

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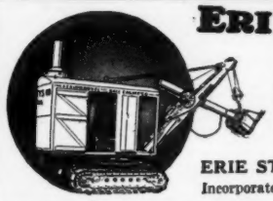

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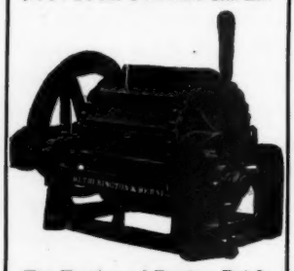

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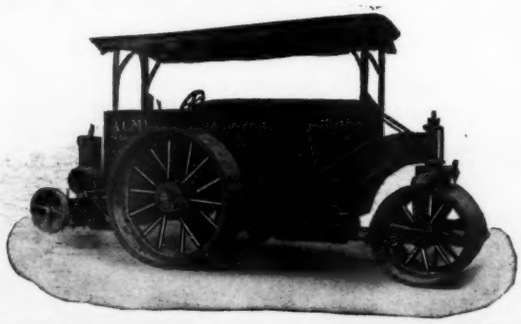

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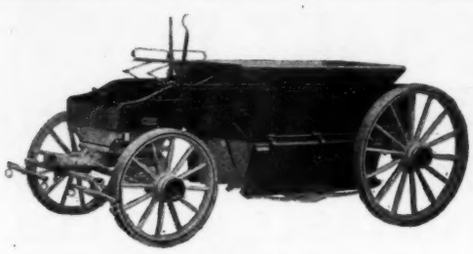

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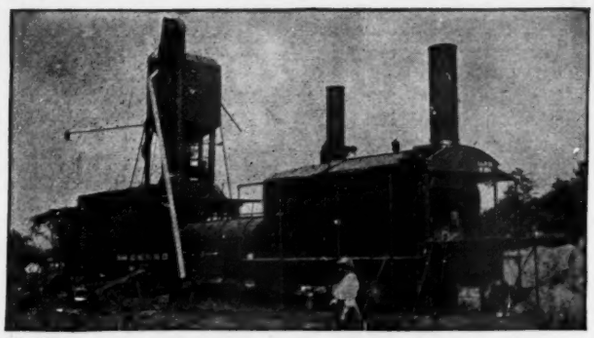

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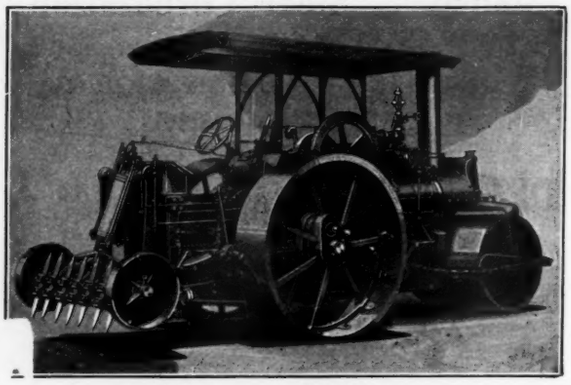

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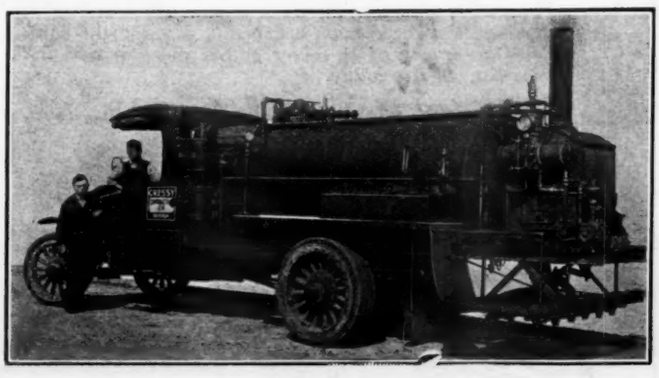

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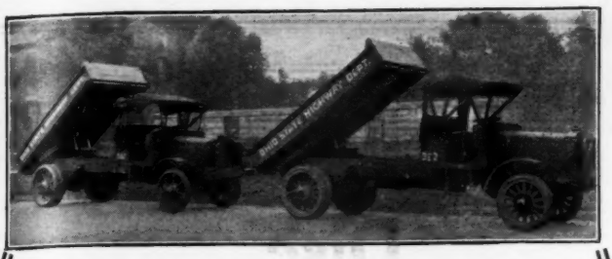

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THE WORLD'S STANDARD

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DURABLE
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Stanolind Paving Asphalt

When You Build

THINK OF THE FUTURE

IT IS reasonable to expect that repairs will be necessary on any road that is in constant use for seven years.

The road illustrated above was built of

Stanolind Paving Asphalt "C"

(Penetration Method)

during 1915, it has been in constant use ever since—but, not one cent has been required for repairs. Consider that when you are thinking about a new road.

Send for our booklet, Stanolind Paving Asphalt. It tells all about the proper construction of asphalt roadways.

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Pageant of Progress Exposition at Chicago's Municipal Pier, July 30 to August 14.

PUBLIC WORKS.

CITY COUNTY STATE

A Combination of "MUNICIPAL JOURNAL" and "CONTRACTING"

Vol. 53 July 8, 1922 No. 2

The Hetch Hetchy Dam

Concrete dam being built by San Francisco to impound 135,000,000,000 gallons of water. Ultimate height of dam from foundation to crest 430 feet, depth below bed of stream 117.5 feet, width of base 298 feet, final length 900 feet. The dam is now being constructed to a height of 226 feet above stream level with 375,000 yards of concrete, to be increased to 625,000 yards when dam is completed. River diverted through 900 feet of 23x35-foot rock tunnel by crib dam 40 feet high and about 320 feet long.

One of the principal features of the construction of the new Hetch Hetchy water works, which is being developed to supply 400,000,000 gallons of water daily to the San Francisco metropolitan area and develop 200,000 hydroelectric horsepower, is the Hetch Hetchy dam which when completed will have a maximum height of 429.5 feet from lowest point of foundation to crest, a length of 900 feet at the crest and a width of 298 feet at the base. It will contain 625,000 yards of concrete masonry and will impound 135,000,000,000 gallons of water in a reservoir having an area of 3 square miles, a length of 8 miles, a width of 0.7 miles, a maximum depth of 300 feet and average depth of 179 feet.

OUTLET VALVES AT SITE AWAITING INSTALLATION.

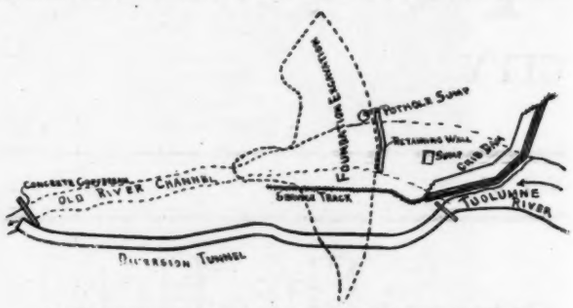
The dam, of the curved gravity type, has a radius of 700 feet at the crest and is composed chiefly of 1:3:6 cyclopean concrete, proportioned for ordinary normal pressures of 25 tons per square foot when the reservoir is empty and 15 tons per square foot when the reservoir is full and for a maximum temporary pressure, under the worst combination of conditions, of 27.5 tons per square foot. No tensile stress is permitted in the concrete. An upward pressure due to two-thirds of the total hydrostatic head is provided for at the upstream face diminishing to zero at the down stream face, where, however, upward pressure from backwater is considered. There is a system of drainage wells lined with 15-inch porous concrete blocks. The drainage wells are 100 feet apart parallel to the upstream face and

are bisected by radial contraction joints sealed by bent copper water stops.

At one end of the ultimate dam there will be a weir-type spillway and a waste-water channel. There will be six outlet conduits, 5 feet in diameter, located at three different levels for irrigation water, and six outlet conduits, 3 feet in diameter, for city water supply.

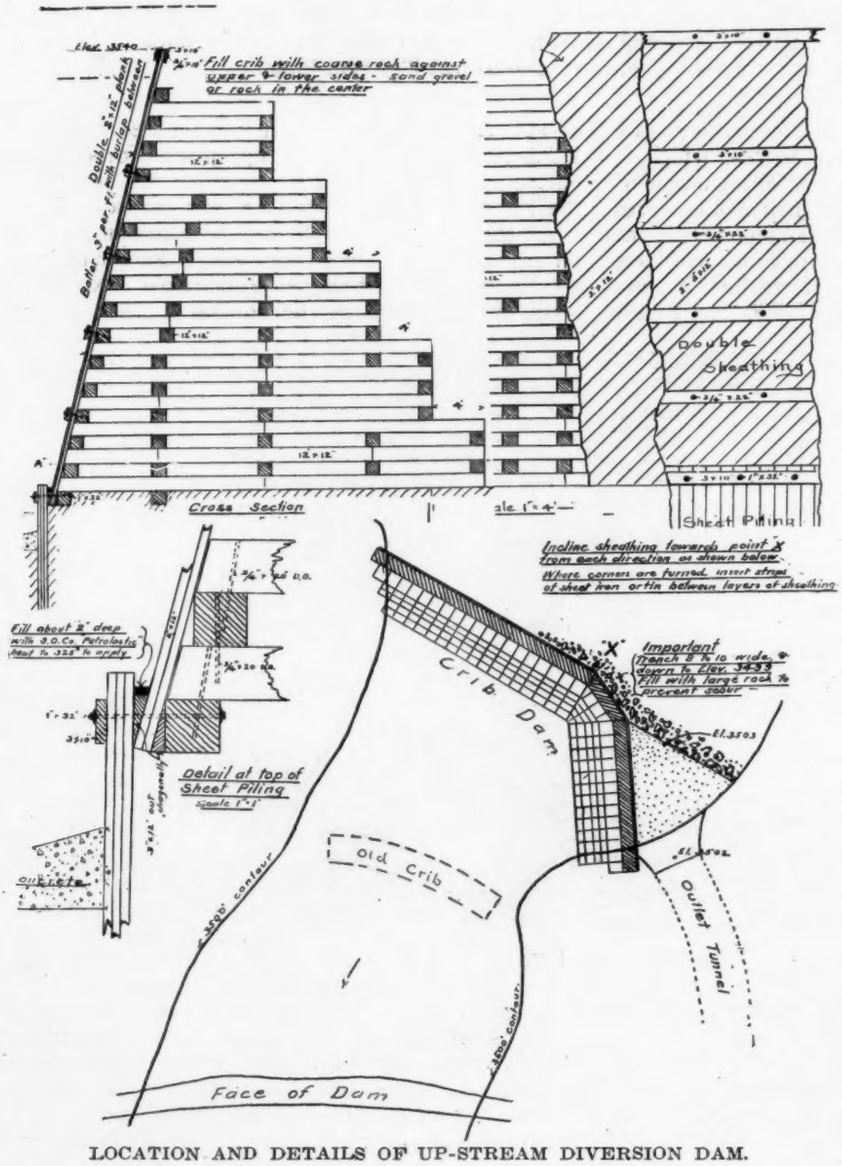
The flow into each conduit will be regulated by balanced needle valves of the Larner-Johnson type, and each outlet will have an hydraulically operated slide gate protected by a reinforced concrete shutter that may be lowered on the upstream side to close the conduit and permit entrance for inspection or repairs.

The dam will not be carried to its complete height at first, but the part now being built will be a complete dam and serve to impound water until the second section is built. The first section will include, in one continuous mass integral with itself, the foundation for the second section complete up to the original bed of the river, 117.5 feet above the lowest part of the excavation. The crest of this section will be 226.5 feet above the bed of the stream



LOCATION OF DAM AND DIVERSION WORKS

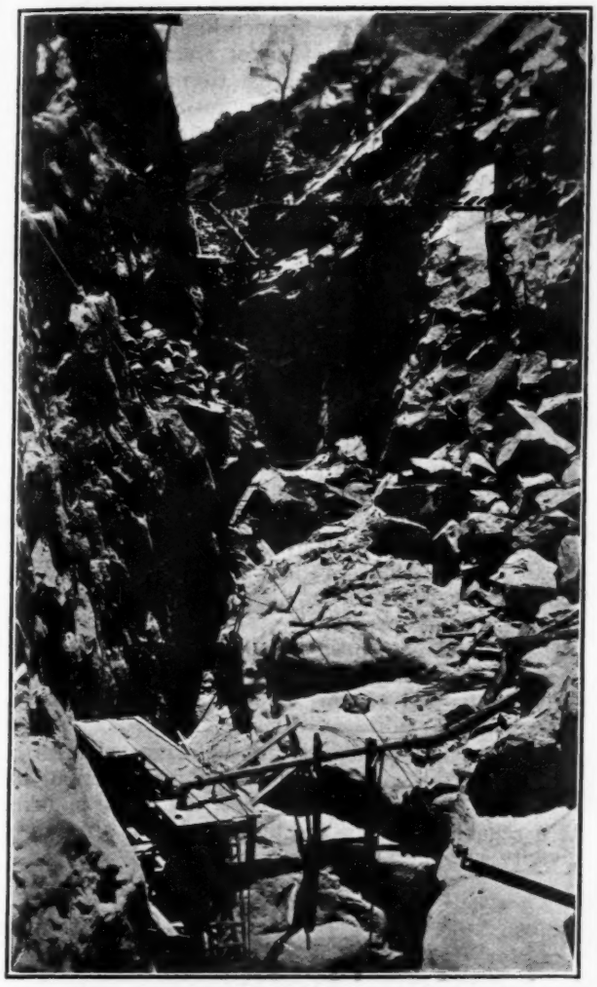
and will be 15 feet wide and 600 feet long. It will contain 375,000 yards of masonry and will have a siphon-type spillway constructed in 18 sections, having a total length of clear opening of 180 feet 6 inches and a height of 8 feet at the entrance tapering to 4 feet at the top of the siphon, and each section will be provided with two 12x24-inch air vents. (See page 24.)


Fill crib with coarse rock against upper & lower sides - sand gravel or rock in the center
Double Sheathing
Cross Section
Sheet Piling
Incline sheathing towards point X from each direction as shown below. Where corners are turned, insert strips of sheet iron or tin between layers of sheathing
Important
Detail at top of Sheet Piling
Crib Dam
Old Crib
Outlet Tunnel
3700' contour
Face of Dam

LOCATION AND DETAILS OF UP-STREAM DIVERSION DAM.

The contract for the first section of the dam was awarded August 1, 1919, to the Utah Construction Co. at an estimated price of $5,447,792, and it is expected that the work will be completed in February, 1923. A general description of the dam was published in PUBLIC WORKS March 27, 1920, and papers on it have been presented by Mr. O'Shaugnessy, city engineer of San Francisco, to the American Water Works Association and to the American Society of Civil Engineers. From the latter, published on page 148 of Part 2 of Volume 48 of the Proceedings, some of the data for this description have been derived and the general cross-section of the dam has been reproduced.

The dam is built across the valley of the Tuolumne river in a canyon of the Sierra Nevada Mountains, more than 150 miles from San Francisco. It spans the whole width of the canyon with abutments and foundations on the solid granite rock. A short distance from the dam site the contractor built a temporary dam, convex upstream, across the bed



EXCAVATION 60 FEET BELOW STREAMBED; SO NARROW THAT STEAM SHOVEL WAS REMOVED.

of the river and diverted the stream flow through a rock tunnel 25 feet wide, 23 feet high and 900 feet long, with its outlet just below a concrete cofferdam, 51 feet long, built across the river chanel below the toe of the permanent dam, and having a grouted foundation on boulders and course gravel. The maximum measured flow of the river is 4,700 second feet and the tunnel was proportioned to carry this volume of water under a head of 13 feet above the top of the tunnel. After the completion of the dam, three of the 3½-foot conduits will be installed in it.

The diversion dam has a cut-off wall of Wakefield sheet piling driven 8 feet to a more impervious stratum and surmounted by rock-filled timber cribs 40 feet high, faced on the upstream side with a double layer of 3-inch planks with burlap and tar paper between and caulked on the outer surface. The joint between the crib face and the cut-off wall was asphalted. The down-stream side of the dam was rip-rapped to prevent sloughing and earth was deposited on the upstream side to give tightness.

After the foundation excavation of the permanent dam had been carried 63 feet below the foundation of the diversion dam, the earth on the downstream side of the latter was retained by a concrete wall, 30 feet high, and more than 100 feet away, convex upstream, which was securely anchored at both ends and prevented any serious movement of the bank adjacent to it, although considerable water from it flowed under the retaining wall.

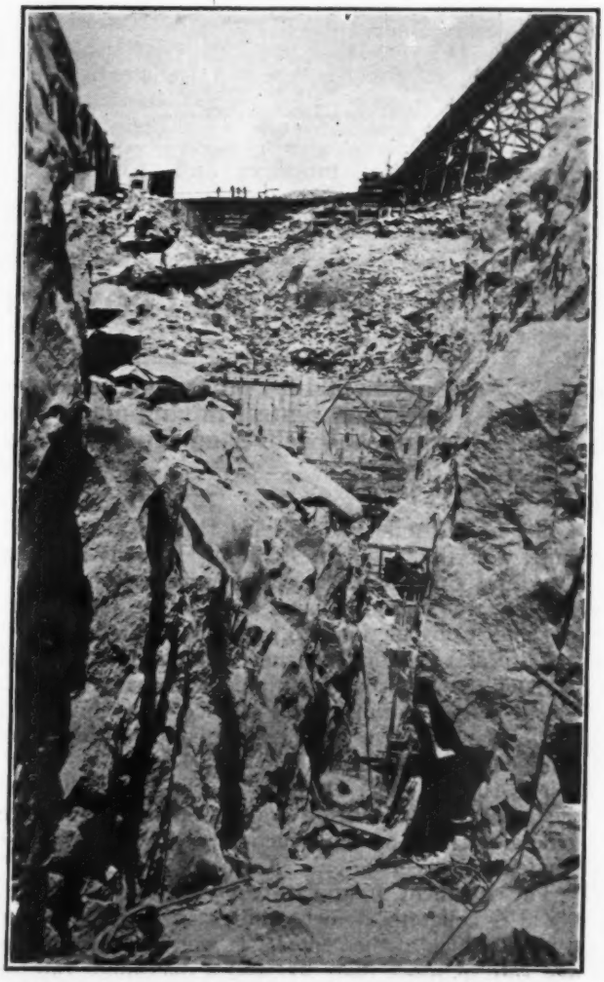
Water penetrating through and under the diversion dam was collected in a high-level sump and in a large natural pothole which served as a low level sump near the end of the retaining wall, from which the water from the lower elevations was pumped and discharged to the river bed 90 feet above. At all times the water in the beds was easily handled by centrifugal pumps from 6 to 14 inches in diameter.

A further description of the construction will be given in the next issue.

The dam was designed and is being constructed under the direction of M. M. O'Shaugnessy, city engineer. The resident engineer for the city is B. R. Rankin and A. Paddock is the construction engineer for the contractor who is represented by H. J. Lawler.

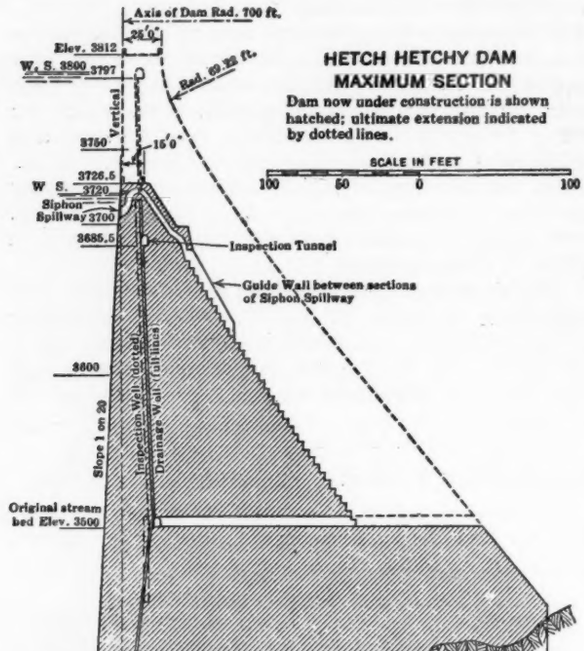
Repairing French Highways Necessary

A program of road building on a large scale in France is outlined in the new budget of the French Minister of Public Works, according to which much



DOWN-STREAM FACE OF DIVERSION DAM, AT TOP. RETAINING WALL WITH FORMS INJURED BY BLAST, SHOWN IN CENTER OF PICTURE. SUMP AND PUMPS IN FOREGROUND.

repair work is needed on the old system of French roads, which totals about 28,000 miles.



SECTION OF DAM, PRESENT AND ULTIMATE

Increased strain on the French highways has been caused by a larger use of motor traction. Figures received by the Bankers Trust Company, of New York, from its French Information Service disclose that the number of automobile tractors and lorries in operation increased from 8,000 in 1913 to 93,000 in 1921, and the total number of motor vehicles from 100,000 to 208,000. An increase in the average speed of operation has subjected the highways to an additional strain.

Construction Operation Increasing

The May Bulletin of the United States Geological Survey reports that the production of Portland cement in the United States during the month of May, 1922 exceeds all previous monthly records, and reached 11,176,000 barrels as against 9,287,000 barrels in 1921. The corresponding shipments were still larger, amounting to 12,749,000 and 9,488,000 for the same years. Similarly the total production for the first five months of the year amounted to 357,763,000, which was larger than for the corresponding months of any previous year. The great demand for Portland cement is attributed to the building boom now under way, to increase in municipal improvements and to the construction of concrete pavements.

As Portland cement is an important element in almost every item of engineering construction, the great and increasing amount now used may be taken as a reliable index of the magnitude and growth of activity in general construction.

Concreting Troy–Pocahontas Highway

Pavement 16½ miles long concreted by 32 men at the rate of 737 feet per day from central mixing plant, with special equipment for storing, measuring, and delivering aggregate, handling cement, charging mixer, loading and turning trucks

The 16 1/2-mile Federal Aid Project No. 9 road contract on the National Old Trail Highway between Troy and Pocahontas in Madison and Bond counties, Ill., was executed last season by the Hug Lumber and Construction Co., which secured notable rapidity and economy by the combination of special methods and improved equipment and arrangement for a central mixing plant service that eliminated much manual labor and promoted continuity and simplicity of operations.

The Illinois State Division of Highways directed the work, S. F. Wilson was assistant engineer in general charge of construction. J. L. Gary was resident engineer.

The pavement, 16 and 18 feet wide, was made with 1:2:3½ concrete 7 inches thick at the edges and 8 inches thick at the center. It was laid at an average rate of more than 500 and a maximum rate of 737 linear feet per day by a total force of 32 men using standard equipment supplemented by labor-saving devices invented by C. J. Hug.

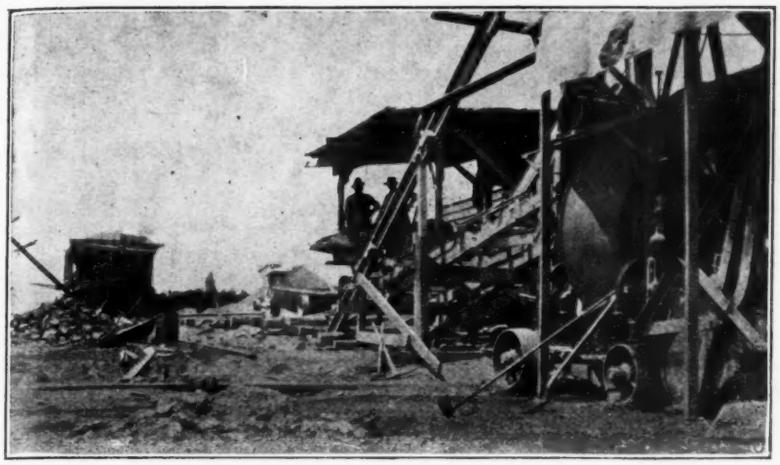
RECEIVING AND STORING

The plant was established 1½ miles north of the Pennsylvania Railroad siding at Pierron, Illinois, and from this siding the materials were delivered by trucks equipped with pneumatic tires to parallel sand and stone piles, with a board fence between to separate sand from stone. The storage piles were about 200 feet long and about 20 feet from the mixer at the nearest end.

A wide track was laid between the stock piles extending to the mixer, and on it were installed two loading bins and a locomotive crane equipped with a 3/4-yard clamshell bucket which transferred the aggregate from the stock piles to the bins. These bins, mounted on six wheels, were placed ahead of the crane, and as the supplies of sand and stone diminished at one place both the crane and bins were moved forward.

MEASURING AGGREGATE

A special hopper under the bins measured the required amounts of sand and stone for a four-bag



PART OF CENTRAL MIXING PLANT

batch. This hopper was supported on a hanging runway under the bins which had two sets of discharge gates. When one set became clogged, the measuring hopper was moved on the runway to the other set of gates. The hopper was filled through slide gates under the bin, allowing materials to pile up under them in cone-shaped mounds until high enough to prevent any additional flow, this insuring that the proper amounts of sand and stone had been discharged, and the gate was then closed and the batch dumped into a special skip, which conveyed it to the mixer.

DELIVERING AGGREGATE

The skip was the regular mixer skip, removed and placed on six wheels. Four of these wheels traveled on a narrow gauge track placed between the rails of the wide guage track, and extending from the mixer under the bins to the top of a short incline terminating at the mixer intake. The other two wheels, at the rear end of the skip, had a wider gauge and when the skip neared the mixer they were carried on their track to a point 4 or 5 feet above the end of the narrow gauge incline, thus elevating the rear end of the skip and tilting it to discharge its contents into the mixer drum. As the skip traveled up the incline at the mixer it tripped two levers; the first released the water for mixing the batch and the second closed the mixer at the discharge end.

This arrangement allowed the mixer operator to concentrate his attention on handling the skip, which was pulled from the storage bins by means of a cable operated by a drum on the mixer engine. The drum was constructed for two speeds, the higher speed used while the skip traveled on level track and the slow speed used to hoist and tip the skip at the mixer. When the friction clutch was released, the skip dropped down the incline, gathering enough momentum to carry it automatically back under the bins. As the skip traveled past a platform at the side of the track, cement was added to the batch. In the rear of a loading platform parallel to the tracks was a cement storage house with a capacity of 35,000 bags.

Cement was trucked by hand from the warehouse to the platform and there dumped into a tilting box at the end of the platform. The box had an opening in the track side and was balanced on hinges. It was charged with four bags of cement while the skip was receiving the sand and stone under the bins. As the skip reached the cement platform it was stopped for a moment and the contents of the box were dumped on top of the batch of aggregate.

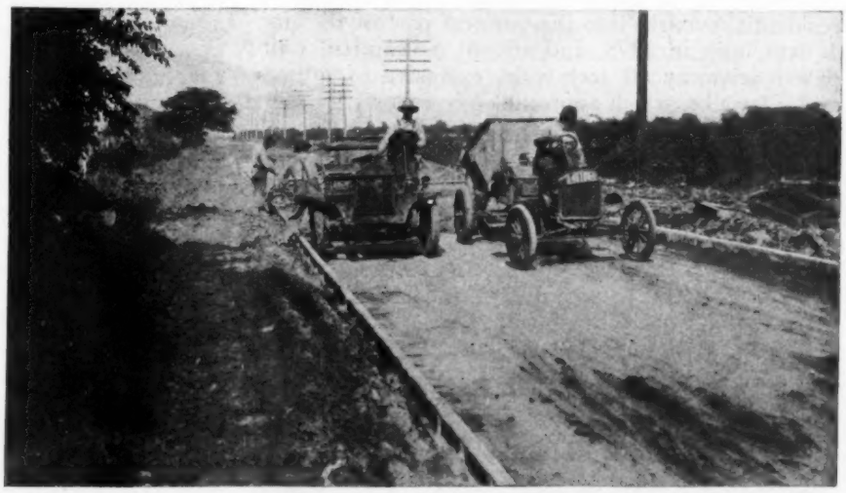
TRANSPORTING CONCRETE

The concrete was discharged from the drum of the Foote mixer into a batch hopper which was then raised on guides and dumped into the bodies of one-ton and two-ton speed trucks, equipped with pneumatic tires and special dump bodies. The two-ton trucks were designed and constructed by Mr. Hug and have established remarkable records under working conditions due to their economy of time and money. Each truck was numbered and the mixer fireman kept a record of the number of trips made by each. The trucks were turned on the subgrade by a turntable which was invented by Mr. Hug. It is operated by the truck's own power in a few seconds and is easily moved along the subgrade.

The average time per trip made by one-ton truck, 11 minutes; average time per trip made by two-ton Hug Speed truck, 7 minutes; average trips per 10 hours by one-tone truck, 40; average trips per 10 hours by two-ton Hug speed truck, 56. The trips were one mile each.

FINISHING SUBGRADE AND CONCRETE SURFACE

The concrete was tamped and finished with a Lakewood finisher. The subgrade was finished by



HAULING MIXED CONCRETE FROM CENTRAL MIXING PLANT IN ONE-TON AND TWO-TON TRUCKS WITH DUMP BODIES

a subgrading machine invented by Mr. Hug, the special feature of which is the facility with which it can be moved from one location to another, making it an easy matter to get off the subgrade. A special crank axle and wheel attachment straddles the machine and a lever attached to the axle makes it possible to lift and lower the wheels on the machine.

WORKING FORCE

The number of men required to operate the plant and to place and finish the concrete was reduced to a minimum, the distribution being as follows: one foreman, one clamshell engineer who also fired, one man measuring batches, two men dumping cement, two men wheeling cement from warehouses, one mixer operator, one mixer fireman, one auto mechanic, ten truck drivers, one man on turntable, three men spreading concrete, one finishing machine operator, two men setting forms, one roller engineer who also operated subgrader, one laborer on subgrade, one pump operator and two laborers covering and curing pavement.

The principal items of equipment installed for the execution of the work included an Orton & Steinbrenner Co.'s locomotive crane; special aggregate storage bins, hoppers and discharge gates; a subgrading machine and a turntable made by the Hug Co.; a 4-sack Foote concrete mixer and engine; a Lakewood concrete tamper and finisher; dump bodies made by the Lee Trailer and Body Co.; and automobile trucks made by the Hug Co. and by the Ford Motor Co.

Restoration of Bigelow Boulevard, Pittsburgh

Retaining walls and cribs and drains constructed to prevent recurrence of slip of 1920 have proved successful.

Bigelow Boulevard, named after the former Director of Public Works of Pittsburgh, is a principal thoroughfare for automobile traffic from the eastern residential suburbs into the business part of the city. It was built in 1898, and affords a beautiful well-paved driveway 40 feet wide, exclusive of gutters and sidewalks, which approximately follows the contours of the hillside along the winding shore of the Allegheny river at an elevation of 74 to 290 feet above the water and the manufacturing plants and railroads in the river valley.

SUBSURFACE DRAINS IN FILL

SLAG FILL AND WOOD CRIB

For a distance of about 1,500 feet it was constructed largely in terraces excavated in the steep hillside or composed of a high fill chiefly consisting of rock and soil from city excavations. The geological formation of the hillside was largely shale and sandstone sparsely covered with loose earth, grass and small trees and shrubs that afforded opportunity for penetration of rain and the collection of water in the seams and crevices between rock strata near the surface. Conditions were such that soon after the completion of the boulevard, cracks and settlements began to appear and were followed by slips and landslides, some of them requiring extensive repairs.

An important slip occurring in November, 1920, displaced an estimated amount of 125,000 yards of earth and rock and wrecked about 300 feet of the boulevard, making it necessary to undertake extensive repairs which were accomplished by a force of about 100 men in four months and cost about $135,000. This involved about 1,000 yards of excavation, 22,000 yards of slag fill, and 2,200 square yards of new paving to restore the original width and surface of the boulevard.

In order to prevent recurrence of the difficulty at this and adjacent points extensive precautions were taken by building retaining structures at the foot of the slope and by constructing a thorough system of drainage intended to prevent the collection of water under the surface and avoid the development of slippery strata and planes of separation on the inclined surfaces of the rock strata.

Near one of the worst points of the slip a 10x30-foot sump was sheeted down to a depth of 14 feet and was provided with natural drainage through two 20-inch cast-iron pipes about 20 feet long, extending from the bottom of the sump, under the foot of the slope, to a point whence they could freely drain into the railroad drain. These pipes have carried an estimated maximum flow of about 14,500 gallons per day, and since their installation no farther indications of settlements have been observed in the embankment above.

In many places on the face of the embankment longitudinal trenches have been dug and tile pipe drains embedded in a mass of broken stone have been installed in them to intercept water flowing down the incline and discharge it to various sumps

and outlets which are expected to be efficient in maintaining dryness and stability in the slag rock, and earth fill as well as in the natural earth slope. About 4,500 feet of vitrified pipe from 4 to 15 inches in diameter and 1,200 yards of broken stone were used for this purpose.

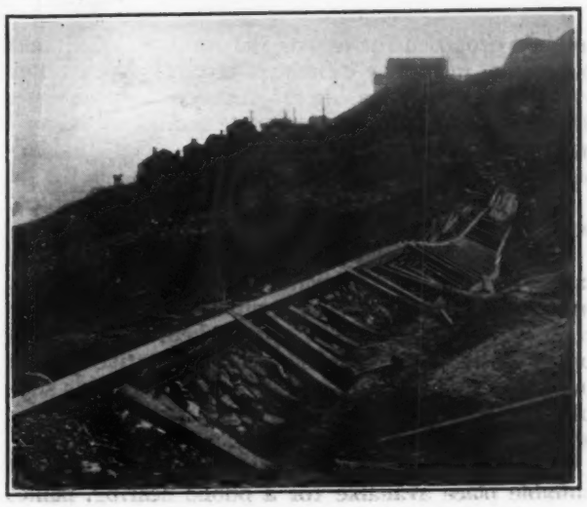
The foot of the slope has been retained by about 330 lineal feet of rock-fill timber cribs in an inclined plane forming a revetment to the surface of the embankment. These cribs having a maximum height of about 12 feet on the incline, are from 6 to 8 feet in width, and are made with two solid walls of 12x12-inch longitudinal timbers braced by well-bolted timber cross-ties from 6 to 8 feet apart in every course, and finished with a solid continuous upper course of transverse timbers, below which the cribs are filled with broken stone providing heavy weight for stability and abundant openings for drainage.

The cribs contain about 23,500 feet of untreated timber which is expected to last for several years until the embankment above them becomes so thoroughly solidified as to be permanently stable without future retaining. It is estimated that the cribs are as efficient as rubble masonry or concrete, and cost less than half as much as the latter would. They were designed and constructed under the direction of Norman Brown, director of the Department of Public Works, and C. M. Reppert, chief engineer; Assistant Chief Engineer Reed was in immediate charge of the construction work. Special Construction Engineer A. L. Snyder was the engineer located on this work and was in charge of same.

$24,000,000,000 For County Highways

An article by Henry E. Shirley, engineer of the Road and Sewerage Department, Baltimore County, Maryland, published in the May *Constructor,* contains interesting data on the 2,400,000 miles of highways in the 3,100 counties in the United States. About one-fifth of this mileage is under state control and the remainder is under county and township control. In the South, Central and Western sections the county is the unit of operation for all local administrative and often for construction activities outside of towns and cities.

DETAILS OF WOOD CRIB RETAINING SLAG FILL.



TOP OF FILLED CRIB AT TOE OF SLOPE.

Highway traffic has increased from 1,000 to 1,500 per cent. in the last few years and highway construction expenditures are from $150,000,000 to $200,000,000 per year for State highways and about the same for county highways. The author estimates that within 25 years the states will take over and construct from 20 to 25 per cent. of the mileage of the county, leaving the counties to construct about 400,000 miles of high grade roads at a cost of $10,000,000,000, an additional 400,000 miles of secondary roads at a cost of $8,000,000,000 and 1,000,000 miles of unimproved earth roads to be improved at a cost of $6,000,000,000, making a total cost of $24,000,000,000 or more than one billion dollars per year necessary to put the county and township roads in condition.

Engineers' Plans for State Health Boards*

Regulations of the State Boards of New York, North Carolina, North Dakota and Ohio.

The engineer's report shall deal with quantity and quality of supply; present and future consumption; location, capacity, etc., of reservoir or tank; character and area of watershed; present and future contamination and control of same; controlling, diverting or regulating works; maximum, minimum and average static pressures in the territory to be served; number of fire streams allowed for, pressure available during fires and length of time they can be maintained; number and distribution of fire hydrants; purification works; "and any other material facts."

The estimate of annual cost must show estimated total annual cost of operating the works, including interest payment, sinking fund or bond principal payments, supervision, maintenance, operation, repairs and extensions. A schedule must show the

*Continued from page 7.

method proposed for raising the funds to meet these payments, including estimated receipts from water rates, fire protection, direct taxation or otherwise. There must be a statement of the total assessed valuation of municipality, tax rate, and effect of operation of proposed works on same.

Specifications of the proposed works shall be filed, whether or not they are to be built by contract.

Bacteriological and chemical analyses of representative samples of the water proposed to be used, made by the State Department of Health or by a competent analyst, shall be furnished, accompanied by affidavit of a responsible representative of the petitioner that the samples were taken from this supply and stating specifically where, when and under what conditions.

The letter of transmission must state the most suitable place available for a public hearing, names and days of publication of all local newspapers suitble for publication of notice of hearing, and names and addresses of petitioner and petitioner's counsel and engineer.

New York. *Sewerage.* All sewerage plans must be submitted to and approved by the state engineer, and permits must be secured from the state commissioner of health for the discharge of sewage and sewage effluents into the waters of the state.

Applications must be accompanied by plans, specifications and a report describing the system in detail. The plans must be in triplicate and the two sets intended for filing with the state must be on tracing cloth, plain cloth or print cloth. One set will be returned with either the approval or disapproval of the state engineer.

General plans must be on a scale not smaller than 300 feet to an inch and preferably not larger than 100 feet to an inch. These will show boundaries, streets, water courses and other topographical features, contour lines at not less than 5 nor more than 10-foot intervals and surface elevations at street intersections; also existing sanitary and combined sewers, but not necessarily storm sewers. There must be shown all the sewers in a complete design of the system, indicating the material, grade, elevation of invert at changes of grade, direction of flow; location of all appurtenances, pumping stations, disposal works, sewer outlets; elevation of stream bed and of high and low water in the stream. The lettering and figures must be of appropriate size and of distinct outline. Surface elevations should preferably be just outside the street line and those of sewer inverts close to the manhole or other appurtenance; both given to the nearest tenth of a foot. All appurtenances must be shown by suitable symbols. Sizes, gradients and direction of flow should be shown between all consecutive manholes or flush tanks. All structures must be indicated by symbols and not by colors, the entire map being drawn in black.

Profiles must be submitted of all sewers more than ten inches in diameter, and all smaller ones when used as main intercepting or outfall sewers. The horizontal scale must be at least as large as that of the corresponding plans and the vertical scale not smaller than ten feet to an inch. Figures must be given showing sizes and gradients of sewers, surface and sewer invert elevations. Stream crossings and sewer outlets with elevations of stream bed and average high and low water must be shown.

There must be detail plans of sewer sections other than vitrified or cast iron pipe, of all ordinary sewer appurtenances and of any special appurtenances or structures such as regulators, pumping stations, etc. These must be drawn to such a scale as to show suitably and clearly the nature of the design, with sufficient dimensions and explanatory notes to make them readily intelligible for examination and a guide for construction.

Where sewage disposal works are planned, complete detail plans must be submitted showing the type and arrangement of all appurtenances such as screens, siphons, sprinkling filter nozzles, etc.; but detail plans need be furnished only of the portions it is intended to construct at present, but provision must be made for future completion of the works, and the location and general arrangement of the complete works must be shown.

Specifications must be submitted together with an estimate of the cost. An engineer's report must be submitted giving full information concerning the design, including the extent of area to be sewered at present and in the future, present and future population, per capita rates or volume of sewage, general character of sewage and proportion and nature of factory wastes, full statement of any known use for potable purposes of the stream into which it is proposed to discharge the sewage or effluent, and the drainage area above points of discharge and recorded or estimated maximum, average and minimum flows. There should be a brief description of the water supply of the municipality, a description of all conditions peculiar to the locality and affecting the design in any way, a description of all special devices used in the design and of any special points to be observed in the maintenance and operation of the system, and a full description of the general arrangement and special features of the proposed sewage disposal works, reasons for the choice of the method proposed and description of its operation.

Accompanying these regulations is a statement of the general requirements of the board, such as that all outfall sewers must be carried below low water, that bypasses around sewage disposal works will not be permitted, that sewer gradients should be sufficient to produce a velocity of not less than two feet when flowing full or half full, that manholes should not be more than 300 to 400 feet apart, that only the separate system will be approved except in certain restricted districts and for very cogent reasons, and that all rain water from roofs and streets and all avoidable leakage must be excluded. In general, rates of operation of sewage treatment plants must not exceed 100,000 gallons per acre per day for intermittent sand filters, 100,000 gallons per acre per day per foot of depth for contact beds, and 300,000 gallons per acre per day per foot of depth for sprinkling filters; and the effective depths of sand filters must generally be between 3 and 5 feet, of contact beds between 4 and 7 feet, and of sprinkling filters between 5 and 9 feet.

The above regulations are for municipal systems. For institution and private systems and for the disposal of industrial wastes the regulations differ somewhat.

North Carolina. This state is about to issue a bulletin giving complete requirements as to submission of plans for water and sewerage systems. The State Board of Health requires a complete engineer's report on every project, outlining in detail all information necessary to form an intelligent opinion. There is also required a general map of the watershed and source of supply and detail plans of all features of the system. Maps and drawings should be 42 inches in length and 36 inches in width and the scale should be such as to bring out clearly all the information intended to be shown.

North Dakota. Plans, specifications and engineer's report must be submitted in triplicate. The regulations for North Dakota are the same as those already published for the state of Arkansas except for the following minor exceptions. Under the head of "Water Works," drawings may be "printed on transparent cloth or on any of the various papers which give distinct lines." The items of "Source of Supply" and "Map of Watershed," required in the engineer's report by Arkansas, are not mentioned in the North Dakota regulations. Also the requirement that the estimate shall include quantities with unit prices used for the different parts of the work is omitted.

Under the head of "Sewerage Systems," contour lines on the sewer map are not called for nor the location of disposal works. In the case of the profiles, the horizontal scale of 100 feet to 1 inch is suggested, while a plan showing the location of Y connections, etc., under each profile is not called for. Under the head of "Disposal Works," plans for disinfecting plant are not included as always necessary. The same difference in making of plans and submitting of estimates is found as in the case of "Water Supply." The forbidding of bypasses is not included in the North Dakota regulations.

Ohio. The chief engineer of the State Department of Health, W. H. Dittoe, writes: "This department does not specify sizes and scales of maps, plans and drawings and these matters are left to the designing engineers. In very rare instances, unsuitable sized and scaled drawings are submitted and in such cases redrawing of the plans is necessary. However, in such instances it is usually the case that the plans are entirely unsatisfactory apart from the size and scale and redrawing would be necessary in any event.

"As a general proposition, this deparment looks with disfavor upon the publication of definite requirements as to design and preparation of plans. Instead, we encourage the utmost co-operation and interchange of views between the engineer and this department in connection with any particular project. Naturally this department must be guided by standards of design resulting from general experience and in accord with good engineering practice, but we do not think it is necessary to publish such standards and in many instances we feel it would be distinctly undesirable."

The regulations require that plans be submitted to the State Department of Health in duplicate, and be accompanied by specifications in duplicate, and a report prepared by the designing engineer giving data regarding the project and evidence of approval of the plans by the council or other governing body of the municipality. (The last requirement may be waived if the improvement is to be made by a firm or corporation.) The plans and specifications must give sufficient detailed information to permit a clear understanding and intelligent review of the project. The plans for a water supply should include a location map showing topography, water courses, roadways, and cesspools, dumping grounds and other possible sources of contamination within 1,000 feet of a proposed underground source of supply; also detailed drawings showing clearly the methods of pumping, purifying, storing and distributing the supply and protecting it from contamination. The sewer map should show the topography, location, size, lengths, grades, manholes, and other accessories of the proposed sewers; profiles should be prepared; also detail drawings of sewer sections, manholes and other appurtenances, pumping stations, etc.; there should be a topographical map of the site proposed for sewage treatment plant and detail plans of such plant.

The health board has prepared a number of printed forms of several pages each, to be filled in with "Information Regarding Proosed Water Purification," "Information Regarding Proposed Surface Water Supplies," "Information Regarding Proposed Ground-Water Supplies," "Data Regarding Proposed Intercepting Sewer," "Data Regarding Proposed Sanitary Sewerage," "Data Regarding Proposed Combined Sewerage," "Data Regarding Proposed Storm Sewerage," and "Data Regarding Proposed Sewage Treatment Plant." These questions are given in considerable detail and the answers to them really constitute a quite complete report on the subject. For example, the form for recording data regarding proposed sewage treatment plant contains about 200 questions, some of which can be answered by a brief yes or no while others require considerable space for reply, such as the estimated cost of the plant, complete description of method of dewatering sludge, etc.

40,000 Gallon Steel Tank Moved on Flat Cars

A steel locomotive water supply tank of 40,000 gallons capacity, with a conical bottom terminating in a large diameter riser pipe and supported on four steel columns about 20 feet high, was recently jacked up 20 inches and transferred to temporary support on timber falsework, installed on the adjacent ends of two standard gauge flat cars, heavily ballasted on the opposite ends, that were brought up on spur tracks close to the water tower on opposite sides. The cars were coupled together by chains and the top-heavy empty tank was ballasted by several yards of gravel deposited on a temporary floor at the bottom of the riser pipe which cleared the rail.

The falsework tower was blocked and wedged to bearing on the inclined bottom of the tank, and the tops of the steel columns were guyed with tackles to the flat cars.

The tank was hauled two miles over the Canadian National Railway to Redpath Junction, British Columbia, without injury, care being taken to adjust the position of the cars when passing around curves by means of turnbuckles connecting the chains.

Meters Require Maintenance

Walter Griffin, superintendent of the Bayonne, N. J., water department, stated recently that the department has increased its revenue about $230,000 without increasing the quantity supplied, largely through putting its meters in order. When he first came to the department he found that many of the meters were under-registering, about 700 houses paying less than 50 cents a year for water because the meters had been allowed to get into such condition as practically to fail to register. These meters have now been replaced with new ones and the result has been a most material gain in the revenues of the department.

Fourth Bates Road Test

Result of two thousand day and one thousand night applications of trucks loaded with 5,500 pounds on each rear wheel.

The fourth of the runs or increments of the progressively increasing loads applied to the Bates road, the test road of the Illinois Division of Highways, was run on June 5th to 14th. In this the load was 5,500 pounds on each rear wheel and 1,900 pounds on each front wheel, corresponding to 550 pounds per inch of nominal width of rear tire and 380 pounds per inch of front tire.

Three thousand applications of the load were made, 1,000 in the daytime, then 1,000 at night, and finally another 1,000 by daytime. The trucks ran in the same tracks as during the third run. As stated last week, the first five sections had been completely destroyed during the third run and were omitted from the fourth.

Under the fourth increment 38 decisive failures resulted, 22 occurring in the daytime and 16 at night. Only 4 of the failures occurred in the north side, the remaining 34 developing on the south side where the line of traffic was directly on the edge of the pavement. The highway officials believe that "these figures prove the contention that if the line of traffic can be held away from the edge of pavements, less failures would occur than when the wheels of the trucks pass directly on the edge." As the number of night applications was just half of the daytime, the number of night failures was 50% greater than the day failures in proportion to the number of applications.

Of the asphaltic concrete pavements on macadam base, one failed completely under the fourth increment. Of the six sections of this type of pavement, one had already failed completely under the first increment, two under the second and one under the third. After 2,400 applications of the fourth increment, water was applied to the subgrade under this section by pouring 500 gallons into short trenches at two points along the south edge of the pavement, following which a failure occurred which was believed to be critical. This was done because the subgrade had dried out somewhat and it was desired to learn the behavior of this pavement under the most adverse conditions. Similar treatment was given another section, as described later on.

Of 12 sections of asphaltic concrete on portland cement concrete base, 6 showed no additional failures under the fourth increment and 6 showed one corner failure each, 5 of which were classed as decisive breaks and the sixth as not decisive.

Of the 13 sections of bituminous filled brick on portland cement concrete base, 9 of them showed no additional failures under the fourth increment, 3 showed one additional corner failure each, 2 of which were considered to have reached their carrying capacity under the second increment and one under the third increment; while the 13th section showed progressive failures on both sides of previously broken adjacent corners, this section also having been considered a failure under the second increment.

Of the seven monolithic and semi-monolithic brick pavements, one was considered to have failed decisively under the first increment, two under the second increment and one under the third increment, the last showing four additional corner failures and progressive breaking at three points under the fourth increment. The other three sections showed additional corner failures under the fourth increment.

Of the 27 portland cement concrete pavements, 3 were considered to have failed decisively under the second increment, 5 under the third increment and 1 under the fourth increment, 13 showed no apparent failures under the fourth increment, and the others all showed two or three additional corner failures or cracks under this increment.

Section 58, which consisted of 4 inches of concrete on a 4-inch rolled stone base, withstood the first three increments without any apparent failures, which was entirely unlooked for as all the other 4-inch concrete sections showed failures to some degree. It was thought that the explanation of this was that the subgrade under this section had dried out more than elsewhere. Moisture sample tests under concrete pavements that had been laid directly on the subgrade showed a moisture content of the soil practically as high as during the spring months and consequently these sections are thought to be receiving the latest heaviest loads while in practically the same condition as when the light loads were applied. In order to determine what the action of Section 58 would be if under the same adverse condition, at the end of 1,750 applications of the fourth loading, a ditch was dug in the shoulder along the south edge of this section and filled with water. Holes were dug opposite this ditch along the north edge and the appearance of water in these holes within 45 minutes after it was placed in the ditch on the south side indicated that the subgrade had been thoroughly saturated. Nineteen Hundred gallons of water were placed in this ditch. Shortly after this, two decisive corner failures occurred in this section, with progressive breaking at one of them.

The fifth increment of load was such that each rear wheel of the trucks carried 6,500 pounds and each front wheel 1,800 pounds. The result of this will be described later.

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Should Check Valves Be Used at Service Meters?

Recently we saw included in the rules of a water company a requirement that a check valve should be set with every meter, and as this seemed to us unusual we made inquries concerning the prevalence of this practice.

We found that of 691 companies and departments replying, 69 per cent did not use check values at meters at all, 9½ per cent used them in "some cases," "where necessary," etc., 4 per cent where steam boilers are connected, 3 per cent where meters had been damaged by hot water, 1½ per cent where hot water heaters are used, and from one to three reported use under each of the following conditions: with large meters, large heating plants, steam coils, hot water and range boilers, high pressure boilers, close to hot water line, factory boilers direct connected, in shops, laundries, hotels and large buildings, where hydraulic elevators are used. Four put it up to the consumer. "Yes" was replied by 8½ per cent, but whether this meant all meters or some was not definite.

It is evident that the great majority of those requiring the use of checks do so to prevent damage to the meters by hot water backing through them from the connected buildings. At the convention of the American Water Works Association instances were reported where these checks were believed to have been responsible for explosions in residence plumbing, and doubt was expressed by some as to the effectiveness of relief valves combined with the checks to prevent such accidents.

One member at this convention said he preferred to occasionally renew a meter disk rather than feel responsible for a single kitchen boiler explosion with its possible loss of life. Put in this way, we believe all superintendents would agree with him. If all regulations contained (as probably most of them do) a provision holding the consumer responsible for damage to meter from heat or freezing, this would seem to relieve the water company or department of expense from this cause; and if consumers are duly warned of the probable causes of such damage, preventive measures and precautions are up to them.

Other accompanying effects, such as heating of water in mains or running the meter backward at very infrequent intervals, would seem to be of minor consideration compared to the possibility of serious accidents.

Skill in Rock Blasting

Rock blasting is an operation influenced by so many local conditions that its success is generally largely dependent upon good judgment and extended experience in the particular locality where the work is executed.

The hardness of the rock, its homogeneity, stratification, dimensions, character of excavation, required dimensions of quarried stone, the equipment for drilling, quality and amount of explosives and rapidity of operations are among the important factors that determine the result in quarrying operations. It is comparatively easy to drill a few holes, load and fire them and shatter a considerable amount of rock that may vary hundreds of per cent. in the total amount of rock loosened per pound of explosive, which may be detached in large masses, shattered to small fragments, barely lifted or blown a long distance. The explosive may expend all of its energy on useful work or a large amount of it may be dissipated in useless or even injurious effects. To locate, direct, dimension and proportion the holes and adjust the powder so as to break the rock where and as required at the minimum final cost is something that must be determined by thorough knowledge of the known conditions, wise judgment of any that are unknown, and with a great deal of skill, experience and courage in the direction of a large job.

For a very large blast individual drill holes are generally replaced by shafts and tunnels containing considerable quantities of dynamite in bulk. Their arrangement to loosen a great yardage of rock and to break it into comparatively uniform fragments of a given size without endangering surrounding property or throwing it too far, is a delicate operation. A remarkably successful achievement of this sort was that reported from Havelock, Ontario, Canada, where about 200,000 tons of trap rock were recently lifted and shattered by the simultaneous explosion of 30 tons of dynamite without, it is claimed, throwing any portion of the rock more than 100 feet. Nearly all of the rock was broken sufficiently to enter a 48x60-inch crusher and was left in an accessible position involving a minimum cost of handling. The

material, corresponding to about 80,000 yards of rock displaced and probably twice as much after being crushed to commercial sizes, was enough to build about 80 miles of concrete road 18 feet wide.

It is estimated that a 10 per cent. larger charge of explosive would have lost most of the rock by throwing it into an adjacent swamp, and 10 per cent. less explosive would not have sufficed to shatter it.

The success of this work is comparable with that of a big blast under very different requirements that was made several years ago for the construction of the Otay Dam, where many thousand yards of rock in the face of the canyon were blown off by a single blast that hurled the rock into the bed of the stream in such a position that much of it sufficed without rehandling to form a portion of the embankment that gave stability to the gravity dam having a steel plate core wall embedded in a thin covering of concrete that extended through the heart of the dam and into recesses cut in the flanks of the mountains at both ends.

Paving Stone in 1921

Figures published by the U. S. Geological Survey for the year 1921 show that while building stone was in little demand and the output of monumental stone decreased more than 45 per cent., paving blocks were in great demand and increases were shown in the sales of curbing and flagging, indicating a revival in street work in cities and towns. There was also an increase of nearly 8 per cent. in the output of crushed stone, due largely to highway work.

The figures given show that in 1920 the sales of paving blocks amounted to 35,959,200 blocks valued at $2,898,459, while in 1921 48,000,000 blocks were sold at an estimated value of $3,000,000. (The 1921 figures are not complete, as the returns were not all in a few weeks ago when this estimate was made, but is believed to be approximately correct). The cubic feet of curbing increased from about 1,500,000 in 1920 to 2,000,000 in 1921 and the cubic feet of flagging from about 689,000 in 1920 to about 700,000 in 1921.

National Hydraulic Laboratory

At the suggestion of John R. Freeman, Senator Ransdell of Louisiana has introduced a bill providing for a national hydraulic laboratory to study flood control and river hydraulics, and the chairman of the Committee on Commerce will ask that a subcommittee be appointed to consider this bill. It is hoped that this will result in investigations that will give the scientific side of river hydraulics the services of research and experimentation equal to those that have been devoted to other branches of engineering.

Strenuous Flood Protection Work

A big hole in the Mississippi river levee in Tunica county, Mississippi, was considerably enlarged in 1916 and threatened the destruction of the levee in the flood of April 20, 1922. The condition was considered to be of great emergency, threatening $10,000,000 worth of property, and a large force was immediately employed making dikes, trestles and revetments and checking the erosion with brush, sacks of earth, steel piles and other resources. In ten days there were used in the "Devil's Hole" 100,000 sacks of earth, from 500 to 800 wagon loads of brush, 50 coils of ¾-inch and 250 coils of ¼-inch rope. Part of the time an emergency force of 800 men and a maximum of 70 wheel scrapers with snap and plow teams were employed. Incessant work was necessary to offset the tremendous erosion, which on one occasion caused a 20-foot subsidence of the revetment. The work was in direct charge of A. L. Dabney, consulting engineer, Memphis. It cost about $50,000 and was considered to have paid 10,000 per cent on the investment.

The Federal Power Commission has received an application from the municipal authorities of Louisville, Ky., for a preliminary permit to cover the power developments at the U. S. lock and dam in the Ohio river at the Falls of Louisville. The city proposes to install 50,000 horsepower when the dam is reconstructed.

The twentieth anniversary of the approval of the reclamation act was on June 17. The Service has constructed over 100 storage and diversion dams, 13,000 miles of canals, ditches, etc., 27 miles of tunnels, costing $133,000,000 and increasing the value of land about $500,000,00.

The Swing bill providing an expenditure of $70,000,000 at the Boulder Canyon and along the Colorado, has been sanctioned by Secretary Fall. Secretary Hoover has also appeared before the Committee. This measure will provide 166,900 acres for ex-soldiers and affects the entire stream system of Arizona, California, Colorado, New Mexico, Nevada, Utah, and Wyoming.

John A. Bensel

John Anderson Bensel, civil engineer, for many years prominent in New York City and New York State, died June 19th in his home in Bernardsville, New Jersey, after an illness of several months. He was a graduate of Stevens Institute of Technology, and was for some years a member of the firm of Spears and Bensel, who executed a considerable amount of substructure and construction work in New York City.

For several years he served in the Department of Docks, New York City, as chief engineer, from 1898 to 1905, and as Commissioner from 1906 to 1908. He was afterwards made a member of the Board of New York Water Supply and was also State Engineer for New York. During the war he was a Major in the Engineering Corps and at the time of his death was consulting engineer for the New York and New Jersey Vehicular Tunnel Commission. He was a member of several engineering clubs and societies and past president of the American Society of Civil Engineers. He is survived by a wife, two sons and two daughters.

Recent Legal Decisions

EFFECT OF FINAL CERTIFICATE UNDER HIGHWAY CONSTRUCTION CONTRACT

The certificate of a county engineer as to the quantity and value of excavation done by a highway contractor can be impeached for fraud, or for gross mistake amounting to fraud. And the California Court of Appeals holds, Vaughan v. Tulare County, 205 Pac. 21, that the finding of the trial court, in an action for balance due on a contract for highway construction, that nearly 25 per cent. of the yardage on a large contract was mistakingly omitted would support the conclusion that a "gross mistake" had been made.

The court also said that an express provision in the contract that the final certificate was "conclusive evidence of the performance of the contract" and "against any claim of the party of the first part," being the county, without any specification that it should be conclusive evidence of the amount due the contractor, or against any claim of his, made it probable that the final certificate was intended to be conclusive evidence, against the county, of the performance of the contract, and not against the contractor, of the amount due.

STATUTE AUTHORIZING EXTRA COMPENSATION TO HIGHWAY CONTRACTORS ON WAR CONTRACTS HELD UNCONSTITUTIONAL

The New York Court of Appeals holds, Gordon v. State, 233 N. Y. 1, 134 N. E. 698, that a highway contractor who had entered into a contract with the state after the commencement of the Great War, but before the United States had become a party, was bound to perform the contract for the consideration therein specified, notwithstanding the burden of increased cost of labor and materials because of war conditions. Chapter 459 of the New York Laws of 1919, authorizing the termination of highway contracts entered into before April 6, 1917, and conferring jurisdiction upon the Court of Claims to hear and determine claims and make awards for increased costs incurred in the completion of such contracts, is held invalid in its entirety, since its purpose and effect is to grant to contractors extra compensation within the prohibition of the state Constitution, art. 3, §28.

LANDOWNER CANNOT OBJECT TO STEPS TAKEN BY DRAINAGE DISTRICT AND CONTRACTOR RESULTING IN DELAY

A drainage contract by its terms fixed the time of its performance and provided for the payment of damages to the drainage district for each day of delay in the performance, and also provided under what circumstances an extension of time could be secured. It is held, Tant v. Little River Drainage Dist., 238 S. W. 848, that a landowner in the district had no right to object to any steps taken by the contractor and the district under these provisions of the contract resulting in delay. The district was the only party who could complain, in the absence of a showing of collusion between the district and the contractor, and that condition was not shown in this case.

METHOD OF ASCERTAINING VALUE OF WATERWORKS SYSTEM FOR ITS PURCHASE BY THE MUNICIPALITY

On the purchase of a waterworks' system by a city from the owners of the system, as between the city and the owners, the Supreme Court of Kansas holds, City of Baxter Springs, Bilger's Estate, 204 Pac. 678, that the service lines between the mains of the system and the property line of its consumers belong to the owners of the system, whether put in by such owners or by its consumers, where the franchise does not specify who shall pay the expense of putting in such service lines.

In an action to determine the value of a waterworks' system for purchase by the municipality, deductions from the amount ascertained by engineers to be the value may be made by the court, where it, after a consideration of all the evidence, finds that such deductions should be made. The court may in this way deduct from the total valuation placed upon the system by engineers the value of any part of the plant as fixed by the engineers, where the court finds from the evidence that that part has no value whatever. In such an action the amount to be deducted for "functional depreciation" is a matter that must be determined by the court from the evidence.

FINDING BY COUNTY COMMISSIONERS OF PUBLIC UTILITY ROAD IMPROVEMENT NECESSARY

The Kansas Supreme Court holds, Hermann v. Larkin, 204 Pac. 768, denying a writ of mandamus to compel a county to proceed with the improvement of a public road, that in order to authorize the improvement of a road under the Kansas statute, it is necessary for the county commission to make an absolute and unconditional finding of its public utility, and that a finding that it is of public utility upon a stated condition is not by the subsequent fulfilment of the condition rendered effective without further action by the board.

PROTECTION OF MATERIAL MEN BY PUBLIC WORKS CONTRACTORS' BONDS

The Arkansas Supreme Court, in Oliver Construction Co. v. Williams, 238 S. W. 615, citing Hill v. American Surety Co., 200 U. S. 197, (construing the statute requiring bonds from contractors with the United States for public works) holds that such statutes and contracts should receive a liberal interpretation to attain the benefit intended, and the requirement of the Arkansas statute that a contractor on public works shall give a bond for payment of all indebtedness for labor and materials furnished is broad enough to include laborers who have performed work for a subcontractor who furnished labor or materials which the original contractor was under obligation to furnish under a contract with a road improvement district. The giving of the bond under the statute adds nothing to the obligation of the contractor. It only has the effect of adding sureties to his obligation and thus more effectively protecting those furnishing labor and materials which are used in the public improvement.

USE OF METERS AND CHECK VALVES

Continuation, from the May 13th issue, of tables prepared from data furnished by superintendents of nearly eight hundred cities.

Municipality	Can their use be legally required?	Are check valves used at meters?	Have check valves damaged kitchen boilers or house piping?	Size of meters for ordinary residences
Arizona:				
Clifton	yes	no	no	5/8" and 1/2"
Douglas	yes	no	.....	5/8"
Glendale	if customer requests	when connected to boiler	no	5/8" and 3/4"
Nogales	yes	very few	yes	5/8"
Prescott	yes	no	.....	5/8"
Tucson	....	no	.....	5/8"
Arkansas:				
Helena	no	where necessary	no	5/8"
Russellville	yes	no	.....	5/8"
California:				
Anaheim	yes	no	.....	5/8"
Benicia	yes	no	.....	5/8"
Burbank	yes	yes	no	3/4"
Calexico	yes	yes	no	3/4"
Daly City	yes	no	.....	5/8"
Dinuba	yes	where people get careless	no	5/8" and 3/4"
El Centro	yes	no	yes	5/8"
Fort Bragg	no	no	.....	5/8"
Fullerton	yes	no	.....	5/8" and 3/4"
Monterey and 3 others	yes	no	.....	5/8" and 1/2"
National City	yes	no	.....	5/8"
Needles	yes	no	.....	5/8"
Oxnard	no	no	no	3/4"
Palo Alto	....	no	.....	5/8", 3/4" connec'ns
Red Bluff	yes	no	no	5/8" and 3/4"
Redding	yes	no	.....	.....
Salinas	yes	no	.....	5/8", 3/4" connec'ns
San Fernando	yes	no	.....	5/8" and 3/4"
Santa Maria	yes	no	.....	5/8" and 3/4"
Santa Paula	no	no	.....	5/8" and 3/4"
So. Pasadena	yes	no	.....	3/4"
Colorado:				
Brighton	yes	no	no	5/8"
Denver	yes	in case of more than one connection	.....	5/8"
Montrose	governed by city ordinances	no	no	5/8"
Sterling	100% meters	no	hot water sometimes warps disk in meter	5/8" and 3/4"
Connecticut:				
New Britain	....	no	.....	5/8" x 3/4", 3/4" & 1"
New London	yes	no	.....	5/8"
Florida:				
De Land	yes	no	yes	5/8" and 3/4"
Fort Myers	yes	no	.....	5/8" and 3/4"
Lakeland	no	no	.....	3/4" and 5/8"
Quincy	yes	no	no	5/8" and 3/4"
Georgia:				
Cedartown	all meters owned by city	no	.....	5/8"
Newnan	no	no	.....	5/8"

Municipality	Can their use be legally required?	Are check valves used at meters?	Have check valves damaged kitchen boilers or house piping?	Size of meters for ordinary residences
Massachusetts:				
Adams	yes	yes	no	5/8" and 3/4"
Fitchburg	yes	only in shops	.....	5/8"
Lynn	yes	no	yes	5/8" and 3/4"
Millbury	yes	no	.....	5/8"
Shrewsbury	yes	no	.....	5/8"
Michigan:				
Coldwater	yes	no meters	.....	.....
Grand Rapids	yes	yes	occasionally	5/8" and 2"
Hancock	....	no	no	5/8"
Iron Mountain	yes	some	no	.....
Royal Oak	yes	no	no	5/8"
St. Joseph	yes	only when troubled with hot water	no	5/8"
Minnesota:				
Alexandria	....	some cases	no	5/8" x 3/4"
Fairmont	....	no	.....	5/8"
Litchfield	....	no	no	5/8", 3/4" spuds
Moorhead	yes	only where hot water on service to steam boilers	no	5/8"
New Ulm	yes	no	.....	5/8"
St. Peter	no	no	.....	5/8"
Mississippi:				
Charleston	yes	no	.....	5/8"
Tupelo	yes	only where boilers are used	no	5/8"
Missouri:				
Chillicothe	yes	no	.....	.....
Fulton	under State Pub. Serv. Com.	no	.....	5/8" x 1/2"
Montana:				
Bozeman	yes	yes	no	5/8" x 3/4"
Havre	yes	where necessary to protect water from hot water	no	5/8"
Kalispell	yes	no	.....	5/8", 3/4" connec'ns
Lewistown	yes	no	yes	1/2"
New Hampshire:				
Newport	yes	no	.....	5/8"
New Jersey:				
West Orange	yes	no	in beginning	5/8"
New Mexico:				
Deming	optional	no	.....	5/8" x 3/4"
Tucumcari	....	no	.....	5/8" x 3/4"
New York:				
Little Falls	yes	no	.....	5/8"
Medina	all metered	no	no	5/8"
Oneida	....	no	.....	5/8"
Owego	....	no	.....	5/8", 3/4" connec'ns
Tonawanda	no	no	.....	5/8"
Whitehall	yes	no	.....	5/8"

Idaho:				
Blackfoot	yes	yes	no	⅝" and ¾"
Burley	yes	no	no	⅝"
Caldwell	....	yes	no	⅝" and ¾"
Coeur d'Alene..	yes	yes	no	⅝" and ¾"
Lewiston	yes	only where power boilers are used	.....	⅝", ¾" connec'ns
Montpelier	yes	no	no	⅝"
Preston	yes	none used	.....	.....
Weiser	yes	no	.....	⅝"
Illinois:				
Hinsdale	by ordinance	no	.....	⅝"
White Hall.....	yes	no	.....	⅝"
Indiana:				
Franklin	yes	no	.....	⅝"
Portland	yes	on steam lines	no	⅝"
Princeton	yes	.....	.....	⅝"
Richmond	yes	factory boilers only if connected direct	.....	⅝"
Rushville	yes	no	no	¾"
Seymour	yes	if connected with heater	no	⅝" and ¾"
Shelbyville	yes	where danger from hot water	.....	⅝", ¾" spuds
Iowa:				
Albia	....	yes	no	⅝"
Cedar Falls....	yes	no	.....	⅝"
Charles City....	....	no	.....	⅝"
Cherokee	yes	stop and waste required back of meter	.....	⅝" and ½"
Nevada	yes	only on steam boilers	no	⅝"
Newton	yes	a few	no	⅝"
Oskaloosa	yes	no	yes	⅝"
Winterset	yes	for kitchen boilers	.....	⅝"
Kansas:				
Augusta	yes	no	.....	⅝"
Baxter Springs.	yes	no	.....	⅝"
Concordia	100% meters	on furnace lines	no	⅝" and ¾"
Council Grove..	yes	no	.....	⅝" and ¾"
Holton	yes	only where there is chance for back flow of hot water	no	⅝"
Junction City..	yes	no	.....	⅝"
Manhattan	yes	in some cases	no	⅝"
Pratt	yes	no	.....	⅝", ¾" connec'ns
Kentucky:				
Georgetown....	no	no	.....	⅝"
Hickman	yes	only where trouble from hot water	one case	⅝", ¾" connec'ns
Hopkinsville ...	yes	only if hot water backs up	no	⅝"
Maysville	yes	no	no	¾"
Paris	yes	only to prevent hot water entering meter	.....	¾"
Maine:				
Calais	no	no	no	⅝"
Gardiner	yes	no	no	⅝" and ¾"
Rockland	yes	only in case of hot water	.....	⅝"
Rumford	yes	not always	one—where no check was used	⅝"
Maryland:				
Baltimore	yes	no	.....	none to install ⅝", ¾" services
North Carolina:				
Concord	yes	few	.....	¾"
Elizabeth City..	optional with Co.	no	.....	⅝", ¾" connec'ns
Henderson	yes	no	no	⅝"
Kinston	yes	no	.....	⅝", ¾" connec'ns
Washington ...	yes	in some cases	no	¾"
North Dakota:				
Bismarck	yes	in some cases where hot water near	no	⅝" and ¾"
Mandan	yes	no	no	⅝"
Minot	yes	no	.....	⅝"
Ohio:				
Bellevue	yes	no	.....	⅝", ¾" connec'ns
Bowling Green.	no	few	no	⅝"
Celina	no	no	.....	⅝"
Conneaut	yes	where danger of hot water	no	⅝"
Delaware	yes	not usually	very few	⅝"
Dennison	yes	no	no	⅝"
Greenville	....	where hot water liable to back on meter	no	⅝"
Leetonia	yes	no	.....	⅝"
Logan	no	no	.....	¾"
Marietta	....	in some cases	no	⅝"
Middleport	yes	no	.....	⅝"
Oberlin	yes	on some services small relief valve	yes	⅝"
Ravenna	yes	when meter near hot water tank	no	⅝", ¾" connec'ns
Salineville	no	on part of meters	no	.....
Shelby	yes	where required	no	⅝"
Struthers	yes	only where necessary	no	⅝"
Toronto	yes	.....	.....	⅝"
Troy	yes	no	.....	⅝"
Urbana	no	where necessary	pressure valve with check valve	⅝"
Wapakoneta ...	yes	no	.....	⅝"
Wauseon	no	no	.....	⅝"
Wilmington ...	no	no	.....	⅝"
Oklahoma:				
Blackwell	all metered	.....	.....	⅝"
Clinton	yes	no	.....	⅝"
Commerce	yes	no	some	⅝"
Durant	yes	no	.....	⅝"
El Reno.....	yes	yes	no	⅝" and ¾"
Guthrie	no	stops	no	⅝"
Henryetta	yes	yes	no	⅝"
Hominy	yes	no	.....	⅝"
Madill	yes	hotels and restaurants	no	⅝"
Miami	yes	on services to boilers	no	⅝"
Norman	yes	no	.....	⅝"
Oklahoma City.	yes	no	.....	⅝"
Okmulgee	....	no	.....	⅝"
Sapulpa	yes	no	.....	¾" x ⅝"
Oregon:				
Eugene	yes	no	.....	⅝"
Grants Pass....	Pub. Serv. Com. does	no	.....	.....
La Grande.....	city regulations do	except on hot water	.....	⅝" x ¾"
Marshfield North Bend.....	yes	no	no	⅝", ¾" spuds
Roseburg	yes	no	.....	⅝", ¾" pipe

(To be continued)

NEWS OF THE SOCIETIES

CALENDAR

July 12-14—NEW ENGLAND ASSOCIATION OF COMMERCIAL ENGINEERS. Exhibition. Auditorium Bldg., Springfield, Mass.

July 18, 19, 20—STEEL METAL CONTRACTORS' ASSOCIATION OF OHIO. Annual convention. Zanesville, Ohio. L. W. Henslee, chairman, convention committee, 623 Putnam Ave., Zanesville, Ohio.

July 19-21—MICHIGAN STATE ASSOCIATION, NATIONAL ASSOCIATION STATIONARY ENGINEERS. Annual convention. Masonic Temple, Kalamazoo, Mich. Secretary, E. C. Smith, 208 W. Vine St., Kalamazoo, Mich.

July 27-28—SHEET METAL CONTRACTORS' ASSOCIATION OF PENNSYLVANIA. Convention. Hotel Lawrence, Erie, Pa. Secretary, W. F. Angermeyer, 714 Homewood Ave., Pittsburgh, Pa.

July 26-28—WISCONSIN STATE ASSOCIATION, NATIONAL ASSOCIATION OF STATIONARY ENGINEERS. Convention and mechanical exhibit. Capitol Building, Madison, Wis. Chairman, convention committee, J. J. Novotny, 2133 Fox Ave., Madison, Wis.

Aug. 15-17—LEAGUE OF IOWA MUNICIPALITIES. Annual meeting. Secretary, F. G. Pierce, Marshalltown, Ia.

Aug. 15-18—INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS. Fiftieth convention. Municipal Auditorium, San Francisco, Cal. Secretary, James J. Mulcahey, Chief, Yonkers, N. Y., Fire Dept.

Aug. 28-Sept. 2—NATIONAL SAFETY CONGRESS. Detroit, Mich.

Sept. 11-15—ASSOCIATION OF IRON AND STEEL ELECTRICAL ENGINEERS. New Auditorium, Cleveland, Ohio.

Sept. 12-15—NEW ENGLAND WATER WORKS ASSOCIATION. 41st annual convention. New Bedford, Mass. Secretary, Frank J. Gifford, Tremont Temple, Boston, Mass.

Sept. 25-28—SOUTHWEST WATER WORKS ASSOCIATION. Annual convention. Hot Springs, Ark.

Oct. 1-6—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention. Cleveland, Ohio.

Oct. 16-19 — AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting. Clevelnd, Ohio.

Nov. 15-16—NATIONAL INDUSTRIAL LEAGUE. Annual meeting. New York City. Secretary, J. H. Beck, Chicago.

Dec. 7-13—NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING. New York City.

AMERICAN SOCIETY OF CIVIL ENGINEERS

The most important action of the Board of Direction in its two-day session prior to the annual convention of the society at Portsmouth, N. H., June 21-22, was the election of John H. Dunlap, of Iowa City, Iowa, as secretary, establishment of technical divisions of the society and a step forward in the settlement of the question whether the society should join the Federated American Engineering Societies.

Professor Dunlap has been secretary and president of the Iowa Engineering Society and is now the president of the Iowa section of the American Society of Civil Engineers.

The by-laws adopted by the Board of Direction permit the formation of technical divisions on the application of 20 members, the division then being authorized to include non-members in its activities.

The question of joining the Federation was deferred until the San Francisco meeting to be held in the Fall.

The following were elected to honorary membership: W. C. Unwin, and Sir Maurice Fitzmaurice, eminent British engineers; Clemens Herschel, hydraulic engineer, New York; John F. Stevens, president, Inter-Allied Technical Board, Harbin, Manchuria, and M. Chagnaud, president, Société Française des Ingénieurs Civils.

Very little business was transacted at the meeting. Weather conditions were such as to prevent any outdoor events, and this permitted the presentation of nine technical papers, which were as follows: L. C. Wason, president of the Aberthaw Construction Co., reported on the well-known Aberthaw tests of concrete piles. The paper was read by a member of his staff. Col. W. G. Atwood read a paper on the activities of the marine borer which is abundant in the Pacific Coast waters. Prof. W. K. Hatt presented a report on the various tests on highways. Wood pulp was the subject of three other papers, these being "Pollution of Streams by Paper Mill Wastes," by Prof. George C. Whipple; of Harvard University, the chemical aspects of the same subject by H. W. Clark, chief chemist of the Massachusetts State Board of Health, and the wood pulp industry in general by E. B. Wardle, chief engineer of the Laurentide Co. of Canada. The Gouin Dam, Quebec, was described by J. H. Brace, of the contracting firm of Fraser, Brace & Co. The problems in connection with the St. Maurice River regulations provided material for a paper by O. Lefebre, chief engineer of the Quebec Streams Commission. The evening closed with an illustrated talk by J. W. Rollins on the foundation work of the Piscataqua bridge at Portsmouth.

CONSTRUCTION COUNCIL

After a two-days session at Washington, D. C., 200 delegates, representing architects, engineers, general contractors, sub-contractors, construction labor, material and equipment manufacturers and dealers, financial, bond, insurance and real estate interests, public utility construction departments, Federal, State, County and Municipal Associations elected as president Franklin D. Roosevelt, formerly Assistant Secretary of the Navy. An executive board of 44 members was elected.

In an address to the council, Secretary of Commerce Hoover stated that the whole question of construction and the problem of construction increase in our national plant can be separated entirely from the problem of production, and that the organization of these industries to perform their best and highest functions is one of the things needed above all in this nation.

W. G. Merritt, attorney, New York, urged a method of arbitration as one of the most important things for the Council to accept, and said that all contracts should be subject to arbitration in accord with the rules of the Council, and that one of the greatest evils in the industry is the bargaining with corruption for fear that any attempt to uncover that corruption will embarrass future relations.

Among the other principal speakers were Willis H. Booth, vice-president of the Guaranty Trust Company of New York; M. T. Bannigan, president of the National Building Supply Dealers' Association; Henry H. Kendall, past president of the American Institute of Architects; William McClellan, of New York, representing public utilities construction; Ralph F. Proctor, of the Maryland Casualty Company of Baltimore; Frederick L. Cranford, vice-president of the Associated General contractors of America; James A. Emery, counsel for the National Manufacturers' Association, and Thomas R. MacDonald, chief of the Bureau of Public Roads, who emphasizes the relationship of the highway industry with the whole construction industry.

The immediate program of action suggested for the new Council as a result of its deliberations includes:

The formation of a code of ethics acceptable to the whole industry and to the public.

The gathering of adequate statistics from all sources and resulting interpretation.

The reduction of the national shortage of building trades mechanics and the establishment of the necessary apprenticeship system.

Co-operation in establishing uniform building codes throughout the country.

Co-operation with the railroads in expediting the revision of existing freight rates on construction materials. The establishing and strengthening of local organizations throughout the country to bring about the co-operation of all elements in conformity with the principles of the Council.

The mitigation of the evils of seasonal employment and trade migration of labor.

The encouragement of local building shows.

Simplification, standardization and elimination of waste.

Education of the public to the distribution of its construction and maintenance requirements more evenly throughout the year.

The promotion of health and safety of workmen.

The reduction of loss of life and waste of construction materials from preventable fires.

The study of old building in order to establish superior methods of construction.

The education of the public as to the necessity and economy of properly maintaining existing structures.

CLEVELAND ENGINEERING SOCIETY

In connection with its recent annual meeting the society made an all-day inspection of the public works in the city. Among the places visited were the pumping station, the municipal bath house, the municipal light plant; the Fairmount and Baldwin reservoirs, the sewerage treatment works, and the filtration plant.

THE CINCINNATI SECTION OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

At a joint meeting with the Cincinnati Engineers' Club, held recently, Dean M. E. Cooley, president of the Federated American Engineering Societies, was the principal speaker.

THE SAN FRANCISCO POST OF THE AMERICAN MILITARY ENGINEERS

The chief speaker, at a recent meeting, was Frank G. White, chief engineer, state harbor commission, who spoke on "Harbors and Terminals: The Port Facilities of San Francisco Bay."

THE WEST AUSTRALIAN BRANCH OF THE AUSTRALIAN INSTITUTE OF ENGINEERS

The following officers were elected for 1922-1923: Chairman, W. H. Shields; Vice-Chairman, T. M. Carey; Secretary, Assistant Professor Tomlinson, and Treasurer, J. Andrews. Members of the committee are R. H. J. Clarke, A. W. Galbraith, H. T. Haynes, P. V. O'Brien, J. Parr, and W. K. Weller.

AMERICAN ROAD BUILDERS' ASSOCIATION

The annual meeting of the association held in New York City on June 15 received from the board of directors the announcement of the election to the presidency of Thomas J. Wasser, state highway engineer of New Jersey, as successor of Lieutenant-Colonel H. L. Bowlby. The board's action broke the deadlock which ended the meeting on May 15, when there was a tie vote between Mr. Wasser and Colonel W. D. Uhler, state highway engineer of Pennsylvania.

LUMBER STANDARDS CONFERENCE

At the conference of Lumber Trade Association in Washington May 22-26 producers and consumers met to promote the standardization and guarantees of quantity and quality of lumber shipments. The report of their activities includes recommendations for the simplification of grades, the standardization of sizes and for the guarantees of grades and quantities. It is proposed that all lumber shall be placed in three main subdivisions: (a)—representing the best qualities; (b)—representing the intermediate qualities; (c)—representing the common qualities.

Action was taken looking toward the establishment of a central bureau for uniformity of grading and inspection and re-inspection.

It was proposed to make a survey determining the feasibility of nationally supervised inspection and a report was made on the standard sizes that has been agreed upon.

THE AMERICAN ENGINEERING COUNCIL OF THE FEDERATED AMERICAN ENGINEERING SOCIETIES.

The meeting of the executive board at Pittsburgh was closed May 27. During the session resolutions on the licensing of engineers were approved, the engineers' employment service was reorganized and the committee on regional activities reported progress on the preparation of a plan for the affiliation of local and state organizations.

It was decided to submit to President Harding a report on federal water power projects in which there will be incorporated criticism of the activities of the federal water power commission.

The organization of government administrative officials was recommended and consideration was given to the important engineering problems of flood control, reforestation, jurisdictional labor awards, patent legislation, waste in agriculture and more intensive engineering organization.

PERSONALS

Hathaway, C. M., district engineer of the Illinois State Division of Highways, has been appointed engineer of construction to succeed B. H. Piepmeier, who resigned to become State Highway Engineer of Missouri.

Campbell, Henry P., senior assistant engineer of Indianapolis, resigned recently to enter a private engineering firm. Melnott N. Beebe, street engineer, has been promoted to his position, while William Lacey, an assistant engineer, has been made street engineer.

Burke, Col. Richard O'Sullivan, for many years engineer of harbor work for the city of Chicago, died on May 11 at the age of 84.

Knauer, William J., county engineer of Chautauqua County, N. Y., with offices in Jamestown, has resigned and will engage in private contracting work.

Stanchfield, G. H., has been made city engineer of Fond du Lac, Wis., to succeed R. B. Petters, who resigned recently.

Dimsdale, H. G., engineer of the Lacombe Northwestern Ry., has been appointed Highways Commissioner of the Province of Alberta, Can.

Earle, Roscoe K., former city engineer of Davenport, Ia., has opened offices in that city, where he will specialize in town planning, sewerage, water supply, flood relief, drainage, paving, surveying, etc.

Dill, C. W., Superintendent of Highways for the Saskatchewan Government, has resigned after occupying the position for over three years.

Adams, James C., deputy city engineer of Binghampton, N. Y., has resigned.

Fluker, T. R., has been appointed manager of the commission form of government of Quitman, Ga.

Robert Whitten has opened offices at 4614 Prospect avenue, Cleveland, Ohio, where he will practice in general city planning and city zoning. He will be associated with A. D. Taylor, landscape architect and town planner.

Fletcher, R. H., has resigned from the Montana State Highway Department to become city engineer of Helena.

Brown, Julius, has been appointed county engineer of Rock county, Minn., with headquarters at Luverne.

Trowbridge, C. G., city engineer and superintendent of construction, Decatur, Ga., has resigned.

Hurtgen, P. J., has been appointed city engineer of Kenosha, Wis., to succeed B. C. Brennan, resigned.

Lozier, W. L., of Rochester, has been appointed engineer in charge of public improvements, Seneca Falls, N. Y.

Rice, C. E., city engineer of Wooster, Ohio, has resigned.

Balknap, Leslie H., deputy state highway commissioner, Lansing, Mich., has resigned and will be succeeded by G. C. Dillman, an engineer in the department of maintenance.

Manning, J. P., has accepted the position of city manager of Sapulpa, Okla.

Williams, John D., who has been connected with the Indiana state government since 1906, has been appointed director of the state highway department, to succeed Lawrence Lyons, whose resignation was tendered to the commission on May 16th.

Deckman, C. J., for many years president of the National Paving Brick Manufacturers' Association, and vice-president of the Medal Paving Brick Company, until his retirement in 1917, died on June 26.

Hull, Walter L., City Engineer of Orange, N. J., died June 20 after a very short illness. At an early age, Mr. Hull began his professional career in the city enginer's office, Brooklyn, and was afterwards employed by the New York Central Railroad, the Lackawanna Railroad, and in the construction of the Pennsylvania tubes under the North River, where he sustained injuries from the air pressure from which he never fully recovered. He had been city engineer of Orange for the past three years.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

BUCYRUS UNIVERSAL SHOVEL RIGGED AS DRAGLINE MACHINE.

A NEW ¾ YARD UNIVERSAL SHOVEL

The Bucyrus Company has just announced a new 20-ton ¾-yard revolving shovel to be known as the 20-B, which replaces their 14-B revolving shovel. From boom point to ash pan, this is a distinctly new design. It is a "Universal" machine, being adaptable to dragline, high lift, sewer, clam shell, crane and other combinations.

The new and exclusive features include a two-part instead of a three-part hoist, whereby the dragline excavator can be made as good a dragline as the shovel is a shovel, wear on rope is reduced, a shorter rope is required, and faster digging speed is made possible without sacrifice of power.

This shovel also has the outside type of dipper sticks and box girder type of boom, the strongest possible construction for successfully withstanding twisting and wrenching strains.

The A-frame is directly connected to a steel center casting, and the back leg instead of being attached to a structural rear end is also connected to this casting. The dipper has all four corners rounded.

This shovel is extremely easy to operate. It is equipped with an improved and simplified three-lever control. One lever controls the independent operation of the throttle and the ram. Furthermore, a release throttle is provided whereby the dipper may be lowered without the need of applying the brake.

The boiler has a larger heating surface and grate area than that of other ¾-yard shovels and is further equipped with a patented scale chamber, making it possible to work with poorer water, with greater steaming efficiency and with less delay.

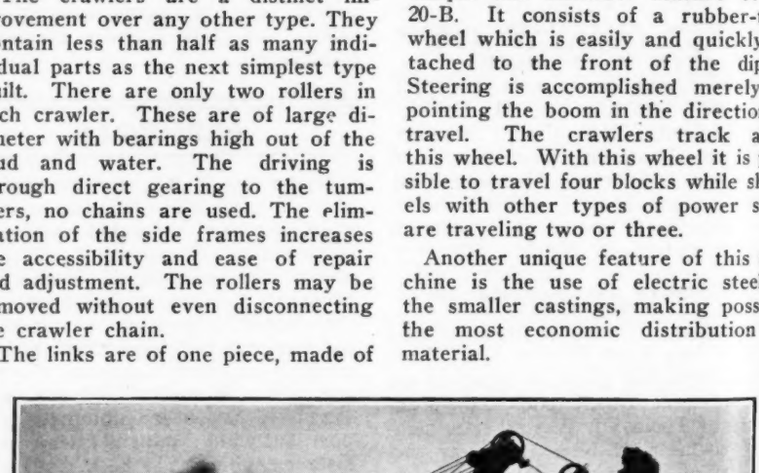
A further unique feature of this shovel is a device whereby the stack may be lowered by power, thus eliminating the possibility of damaging the stack and the rear of the house. Accessibility and simplicity of upkeep are prominent in the design throughout. One instance thereof is the ability of lifting out the vertical propelling shaft from the top instead of extracting it from the bottom, and another, the fact that the swing rollers are arranged so that they may be removed without the necessity of jacking up the frame.

The crawlers are a distinct improvement over any other type. They contain less than half as many individual parts as the next simplest type built. There are only two rollers in each crawler. These are of large diameter with bearings high out of the mud and water. The driving is through direct gearing to the tumblers, no chains are used. The elimination of the side frames increases the accessibility and ease of repair and adjustment. The rollers may be removed without even disconnecting the crawler chain.

The links are of one piece, made of a specially selected and a specially treated steel. The pin connections are on the outside, not at the center. This assures a straight travel and prevents damage should a link strike an obstruction on its edge. There are only 23 links in each crawler. They form a perfectly smooth platform with no gaps between the links to pick up rocks and act as small jaw crushers. They won't rip up a pavement. This shovel has easily climbed out of a muddy pit on a 20 per cent grade of slippery clay. The crawlers do not extend at either end beyond the distance occupied by the traction wheels, a feature which is of great importance for digging in small basements.

For operation in the pit, where a pit-man is always available, a simple and effective hand steer is provided. The clutches are on the outside where they are accessible and high out of danger of getting clogged with mud. There are no links and rods to get out of order. For moving from job to job a patented power steering wheel is provided. This is an absolutely unique and exclusive feature of the 20-B. It consists of a rubber-tired wheel which is easily and quickly attached to the front of the dipper. Steering is accomplished merely by pointing the boom in the direction of travel. The crawlers track after this wheel. With this wheel it is possible to travel four blocks while shovels with other types of power steer are traveling two or three.

Another unique feature of this machine is the use of electric steel in the smaller castings, making possible the most economic distribution of material.



BUCYRUS UNIVERSAL SHOVEL RIGGED WITH DIPPER HANDLE AND CONNECTING ENGINE

Advance Contract News

ADVANCE INFORMATION ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STREETS AND ROADS

Cal., Sacramento **July 17**
For grad. 11.3 mi. rd.—A. B. Fletcher, St. Hwy. Engr.

Fla., Palatka **July 22**
For const. 22 mi. rd. from Palatka to Melrose—Co. Comrs.

Fla., Safety Harbor **8 p.m., July 18**
For pav. with vitr. brick with asph. filler, asph. block, rock base with asph. wearing surf.—Town Clk. A. E. Shower.

Ida., Pocatello **2 p.m., July 14**
For grad. and surf. with gravel or crushed rock 2.78 mi. F. A. Proj. No. 60, Sect. A—Director Hwys., Boise.

Ill., Geneva **2 p.m., July 12**
For county road work—C. L. Hanson, Co. Supt. Hwys.

Ill., Atkinson **p.m., July 12**
For 8,700 sq. yds. conc. pav.—Vil.

Ill., Chicago **11 a.m., July 10**
For impv. Ogden Ave.—Bd. Local Impvs.

Ill., Springfield **10 a.m., July 10**
For S. B. I. Route 15, Sect. 1, St. Clair Co., 1.37 mi. rd—Dept. Pub. Wks. & Bldgs.

Ind., Connersville **7.30 p.m., July 20**
For pav. rdways. of various sts—Special Commitee, Common Council.

Ind., Evansville **10 a.m., July 24**
For impv. Vogel School Rd., $15,815—Willis M. Copeland, Co. Aud.

Ind., Indianapolis **2 p.m., July 17**
For grad. and pav., etc., on sev. sts.—Bd. Pub. Wks.

Ind., Indianapolis **10 a.m., July 10**
For grad. and pav. rdways. on various sts.—Bd. Pub. Wks.

Ind., Union City **July 10**
For paving in High St.—Common Council.

Ia., Algona **1.30 p.m., July 14**
For pav., etc., on 1.8 mi. prim. rd.—Co. Aud.

Ia., Allison **2 p.m., July 13**
For grad. 14.89 mi. prim. rd.—Co. Aud.

Ia., Allison **2 p.m., July 14**
For gravel surf. 11.42 mi. and 2.9 mi. rds.—Co. Aud.

Ia., Cresco **1.30 p.m., July 11**
For grad. 10.414 mi. prim. rd. No. 103—Co. Aud.

Ia., Emmetsburg **1.30 p.m., July 27**
For grad., etc., on prim. rd. No. 19—Co. Aud.

Ia., Northwood **2 p.m., July 12**
For grad. and drain. 14.5 mi. prim. rd.—Co. Aud.

Mass., Boston **1 p.m., July 11**
For 16,038 ft. bit. mac. rd. in Great Barrington, 2,200 in Framingham, 10,200 in Lexington and 1,225 in Wrentham—A. W. Dean, Ch. Engr., Dept. Pub. Wks., Div. Hwys.

Mich., Carol **12.30 p.m., July 17**
For impv. 2.176 mi. rd. in Tuscola Co. F. F. Rogers, St. Hwy. Comr.

Mich., Chesaning **12.30 p.m., July 19**
For impv. 2.128 mi. St. Trunk Line Rd. No. 47-2, 4.631 mi. Rd. No. 47-3, and 1.751 mi. Rd. No. 47-10—F. F. Rogers, St. Hwy. Comr.

Mich., Grand Haven **2 p.m., July 20**
For impv. 4.774 mi. St. Trunk Line Rd. No. 51-2, Sect. A—F. F. Rogers, St. Hwy. Comr.

Mich., Ionia **1.30 p.m., July 19**
For impv. 4.862 mi. Assessment Dist. Rd. No. 346—F. F. Rogers, St. Hwy. Comr.

Mich., Mt. Clemens **1 p.m., July 18**
For impv. 2.040 mi. St. Rd. No. 59-2, and 2.767 mi. Rd. No. 59-1, Sect. B—F. F. Rogers, St. Hwy. Comr.

Mich., St. Joseph **5 p.m., July 19**
For grad. and pav., etc.—Harry Harper, City Clk.

Mich., Muskegon **10 a.m., July 20**
For impv. 0.379 mi. St. Trunk Line Rd. No. 24-13—F. F. Rogers, St. Hwy. Comr.

Mich., Sault Ste. Marie **10.30 a.m., July 19**
For impv. 17.423 mi. rd. in Chippewa Co.—F. F. Rogers, St. Hwy. Comr.

Mich., White Cloud **10 a.m., July 14**
For impv. 8.476 mi. rd. in Newaygo Co.—F. F. Rogers, St. Hwy. Comr.

Mich., Ann Arbor **7:30 p.m., July 14**
For const. conc. curb and gutter, also lateral sewer.—Isaac G. Reynolds, City Clk.

Minn., Elk River **July 10**
For grad. and graveling 3 mi., $25,000—C. S. Wheaton, Jr., Co. Aud.

Mo., Bloomfield **11 a.m., July 13**
For grad., const. culvts., bridges and gravel pavt., etc., on 14.841 mi. Proj. 187—B. H. Piepmeier, Ch. Engr., St. Hwy. Com.

Mo., Carthage **2 p.m., July 13**
For grad., const. culvts., pavt., etc., on 1.393 mi. Proj. 168-A—B. H. Piepmeier, Ch. Engr., St. Hwy. Com.

Mo., Lebanon **2 p.m., July 14**
For grad., const. culvts., etc., on 4.708 mi. Proj. S-20, 179—B. H. Piepmeier, St. Hwy. Com.

N. H., Concord **2 p.m., July 14**
For const. 1.67 mi. modified asph. on crushed stone base in Hooksett.—F. E. Everett, St. Hwy Comr.

N. J., Belvidere **1 p.m., July 21**
For const. St. Hwy. Route No. 5, Sect. No. 8, 34.522 sq yds. rein. Port. cem. conc. pavt.—Bd. Chosen Freeholders.

N. J., Bloomfield **8 p.m., July 17**
For impv. pavt. on cert. sts—Donald F. Peck, Town Clk.

N. J., Jersey City **3 p.m., July 11**
For repairs to asph. pavt., also regulat. and repav.—Edw. J. Holland, City Clk.

N. Y., Albany .. .. noon, July 21
For impv. Carrollton bridge in Cattaraugus Co. and impv. 2.77 and 8.35 mi. rds. in Allegany Co., 4.23 mi. in Fulton, 2.75 mi. in Oneida, 7.73 in St. Lawrence, 1.01 in Steuben and 1.65 in Wayne Co—Herbert S. Sisson, St. Hwy. Comr.

N. J., Camden **forenoon, July 12**
For const. 20,784 sq. yds. rein. conc. surf. pavt.—Bd. Chosen Freeholders.

N. J., Newark **11:15 a.m., July 10**
For impv. Belleville Ave. with sheet asph. and granite block on 6-in. conc. base and const. storm drain. system.—Geo. C. Bergen, Co. Purch. Agt.

N. J., West Orange **3 p.m., July 13**
For impv. Laurel Ave. with rein. conc. pavt., incl. drain, etc.—Board Chosen Freeholders.

N. Y., Manhattan **2.30 p.m., July 12**
For const. sidewalks along Woodhaven Ave., in Forest Park, Queens.—Park Bd., Mun. Bldg.

O., Akron **July 15**
For pav. 7 sts. and grad. and walks on 2 sts.—M. P. Tucker, Serv. Dir.

O., Cleveland **Noon, July 14**
For grad., drain., curb., pav. and otherwise impv. drives—Comr. Purchases and Supplies.

O., Findlay **July 13**
For resurf. sev. sts.—Clk., Dir. Pub. Serv.

O., St. Clairsville **July 10**
For impv. Ramsey Ridge Rd.—Co. Aud.

O., Columbus **July 14**
For pav. with brick on Ravenna-Warren Rd., also on Painesville-Warren Rd.—L. C. Herrick, Dir. Hwys.

O., Cincinnati **July 12**
For pav. with bitum. mac. in 2 aves.—Vil. Clk., Deer Park.

O., Tiffin **July 11**
For pav. Schreiner Rd. with bit. mac., $17,755—J. H. Morcher, Co. Aud.

Pa., Clairton **July 10**
For grad., curb., drain., pav. and sewering various sts.—R. M. Evans, City Engr.

Pa., Greensburg **10 a.m., July 11**
For repair. Jeannette-Penn Rd., rein. conc.—W. A. Arter, Co. Comptroller.

Pa., Greenville **July 10**
For bitum. surf. course on conc. base—Boro Secr'y.

Pa., Mifflin **7.30 p.m., July 10**
For const. conc. rdway. with curbs, drains and inlets—Boro Council.

Quebec **July 11**
For 53,332 ft. Montreal-Ottawa Hwy., mac., also 11,687 ft. Joliette-L'Assomption Hwy., gravel—I. L. Boulanger, Deputy Minister, Dept. Pub. Rds., Parliament Bldgs.

Va., Covington **7:30 p.m., July 11**
For const. st. pav.—C. P. Barnett, Consulting Engr.

Wash., Waterville **11 a.m., July 15**
For const. balance of Perm. Hwy. No. 10, by grad., drain. and surf. with crushed rock or gravel—Bd. Co. Comrs.

Wash., Seattle **10 a.m., July 10**
For const. Bothell-Woodinville pav.—Bd. Co. Comrs.

W. Va., Moundsville **July 18**
For grad. 2,846 ft. rd. and grad., pav. and conc. curb. 3,300 ft. rd.—Co. Comrs.

SEWERAGE

Colo., Ft. Collins **8 a.m., July 8**
For const. $13,000 rein. conc. settling basin with 2,000,000 gals. capacity—City Engr.

Ind., Princeton **7:30 p.m., July 17**
For cert. san. sewers.—Chas. Curran, City Clk.

Ia., Creston **8 p.m., July 17**
For const. 4,656 lin. ft. 15-in. vitr. clay pipe outfall san. sewer—P. K. De Voe, City Engr.

Ky., Louisville **2 p.m., July 11**
For const. sewers in cert. sts.—Bd. Pub. Wks.

N. J., Hackensack **8 p.m., July 24**
For const. and equipment of disposal works, etc.—Hackensack Impv. Com.

N. J., Newark **10 a.m., July 18**
For const. city dock local sewer connection.—Passaic Valley Sewer. Comrs., 128 Market St.

N. Y., Brooklyn **11 a.m., July 12**
For repairs to sewer and for const. various sewers, and const. sewer basins—Edw. Riegelmann, Boro. Pres., Boro Hall.

O., Akron **July 10**
For sewers in cert. sts.—Clk., Serv. Dir.

O., Cleveland **noon, July 14**
For const. main and branch rdways. and appurt. at sewage treatment works—Comr. Purchases & Supplies.

O., Akron **10 a.m., July 13**
For const. 1 mi. 12-in. to 18-in. pipe sewer with appurt.—Bd. Co. Comrs.

Tenn., Lebanon **4 p.m., July 10**
For const. sewerage system and disposal plant, also ext. of water system.—A. B. Clenny, City Engr.

LIGHTING AND POWER

Fla., Homestead **8 p.m., July 28**
For const. mun. light plant.—Town Council.

Mich., Grand Rapids **2 p.m., July 13**
For two 500 h.p. steam boilers for pumping and ltg. plant.—G. J. Wagner, Dir. Pub. Serv.

N. C., Belhaven **July 19**
For engine-generator unit with appurt.—W. C. Olsen, Consulting Engr., Kinston.

O., Ada **July 10**
For const. rein. conc. power house.—C. C. Carpenter, Engr.

O., Galion **July 12**
For new municipal light plant, etc.—K. A. Poister, Dir. Pub. Serv.

WATER SUPPLY

Fla., Vero **8 p.m., July 12**
For water works system, incl. mains, tower, pumping plant, treatment plant, artesian well.—City Council.

Mass., New Bedford **10 a.m., July 8**
For furn. carload Leadite—Water Bd.

Mo., Kansas City **2 p.m., July 12**
For lime and c. i. water works specials for water dept.—Water Com.

Neb., Lincoln **10 a.m., July 8**
For const. water mains and appliances in Water Dist. No. 33—Theo. H. Berg, City Clk.

N. J., East Orange **8 p.m., July 20**
For water supply, incl. bldgs. and structures, machinery and equip., elect. equip., driven wells, pipe and appurtenances.—Roswell M. Roper, Secr'y., Bd. Water Comrs.

N. Y., Manhattan **10.30 a.m., July 13**
For furn. hose nozzles and hydrant couplings, pumps and keys to Dept. St. Clean.—Bd. Purchase, Mun. Bldg.

N. Y., Saugerties **2 p.m., July 19**
For excav. and lay. water main, constructing cofferdam, etc., incidental to increasing capacity of reservoir.—Bd. Water Comrs.

N. C., Wilmington **noon, July 18**
For const. additions to present water purfication plant and ext. water intake line 2 mi.—R. C. Cantwell, Comr. Pub. Wks.

O., Toledo **noon, July 25**
For const. additional coagulating basin at water purification works—W. T. Jackson, Dir. Pub. Serv.

O., Bexley **noon, July 10**
For const. c. i. water main with valves and hydrants—Bd. Trustees Public Affairs.

Tenn., Fayetteville **July 18**
For rein. conc. reservoir, conc., 1,000,000 gal capacity—W. G. Kirkpatrick, 2103 Erdman Ave., Baltimore, Md., Engr.

Wis., Benton **July 11**
For 30,000 gal. water tank, steel or wood on present stone tower, incl. pipe and valve connections—A. F. Whaley, Vil. Clk.

DRAINAGE AND IRRIGATION

Ark., Little Rock **2 p.m., July 18**
For const. conc. flood gate and apput.—Sec., Farelly Lake Levee Dist.

Mich., Detroit **11 a.m., July 11**
For const. Breitmeyer drain—Geo. A. Dingman, Co. Drain. Comr.

Minn., Duluth **1 p.m., July 10**
For const. tile drain—W. H. Borgen, Co. Aud.

Ont., Elma **July 8**
For const. Boyle drain, tile up to 18 in., $81,000—J. Roger, Engr.

FIRE

N. Y., Manhattan **10:30 a.m., July 11**
For rescue truck and tank wagons to fire dept.—Bd. Purchase, Mun. Bldg.

BRIDGES

Ill., Chicago **1 p.m., Aug. 14**
For const. superstructure of hwy. bascule bridge in Burnham—Bd. Co. Comrs.

Ind., Fort Wayne **10 a.m., July 14**
For const. 5 bridges in Allen Co.—Bd. Co. Comrs.

Me., Portland **noon, July 21**
For rebuildg. floor of bridge.—Comrs. Pub. Wks.

Mich., Menominee **10.30 a.m., July 20**
For const. 4 culvts. on St. Trunk Line Rd. No. 91-1—F. F. Rogers, St. Hwy. Comr.

Minn., Little Falls **2 p.m., July 10**
For Bridge No. 3781, St. Rd. 6—Co. Aud., B. Y. McNairy.

Minn., Owatonna **2 p.m., July 10**
For culvt. on St. Aid Rd. 5—Geo. Griffin, Co. Aud.

N. J., Trenton **2.30 p.m., July 11**
For reconst. 3 culvts. on Whitehorse-Yardville Rd.—Chas. H. Reichert, Dir., Dept. Bridges & Culvts.

N. Y., Manhattan **2 p.m., July 14**
For reconst. centre pier fender of Meeker Ave. bridge over Newton Creek—Grover A. Whalen, Comr. Plant & Structures, Mun. Bldg.

O., Steubenville **July 14**
For bridge on Bergholz and Alliance Rd.—S. M. Floyd, Co. Aud.

O., Cleveland **July 29**
For const. bridge on Highland Rd.—Bd. Co. Comrs.

Pa., Harrisburg **10 a.m., July 19**
For rebldg. rein. steel conc. arch filled bridge—Henry W. Gough, Co. Controller.

Pa., York **10 a.m., July 17**
For reflooring bridge—E. S. Bartenschlager, Co. Controller.

MISCELLANEOUS

La., New Orleans **July 28**
For timber bulkhead const. and dikes at Miss. River.—War Dept., Dist. Engr.

Me., Portland **1 p.m., July 18**
For pier sheds and grain conveyor gallery at state pier.—Directors, Port of Portland.

N. J., Trenton **2.30 p.m., July 11**
For furn. 2 twin mechanical automatic hoists with steel bodies and full equip.—Geo. W. Hutchinson, Dir., Dept. Rd. Repair.

N. Y., Albany **noon, July 25**
For const. barge canal terminals.—Chas. L. Cadle, Supt. Pub. Wks.

EXPANSION JOINT

1. Type A-A—Fibre centre non-oozing joint (Solid crown and sides).
2. Type B—Bituminous cellular fibre joint (75% Bitumen).
3. Type D—Cellular fibre joint (solid edges and sides, self expanding).

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Work Contemplated

STREETS AND ROADS

Ala., Mobile—City will issue $800,000 5 per cent street bonds.

Ala., Montgomery—Plan announced to place Prattville on hwy. link as result of proposal of Louisville & Nashville R. R. presenting state with abandoned railroad bridge across Alabama River, near Montgomery, for use as hwy. bridge for Birmingham-Montgomery link of State hwy.

Ala., Birmingham—New road from Birmingham to Pelham proposed, 20 miles.

Ark., Eudoka—The City Council will soon offer for sale $20,000 pav. bonds.

Cal., Calipatria—Plans pav. 1½ mi. Main St.—H. Tsheppe, City Engr.

Cal., Fresno—Soon takes bids grad. and pav. Peralta Way between Lucerne Lane and Van Ness Blvd., 70,645 sq. ft. grad., 61,600 sq. ft. 3½-in. asph. and 1½-in. war. top., 6,145 sq. ft. gutter, 1,760 l. ft. curb, 2,307 sq. ft. walks, etc.—W. Stranahan, City Clk.

Cal., San Diego—Plans prep. pav. Ash, Beech, Cedar and 7th Sts., 2,251 l. ft. cement curb, 7,266 sq. ft. cem. sidewalks, 3,658 sq. yds. 5 in. conc., 7,225 sq. yds. 1½-in asph. conc.—F. A. Rhodes, City Engr.

Cal., Yuba City—Bids about July 5 impv. sts.

Fla., Clearwater—Will soon call new bids for rd. const.

Fla., Avon Park—Plans prep. for const. 17 sts., pav. with clay on some sts. and asph. on others.

Fla., Arcadia—Voted $500,000 bonds pav. 26 mi. rd., $500,000 bonds pav. 20 mi. rd., from Hardee Co. line, $500,000 bonds for 18 mi. State Rd., etc.

Conn., New London—Plans 8 mi. conc. sidewalk in various streets, $50,000—Dept. Pub. Wks., City Hall, Engrs.

Fla., Tampa—Two hundred and fifty thousand dollars set aside in the $2,000,000 bond issue for various city impvs. Forty-eight thousand dollars' worth of st. pav. contracts have been let and the work is now under way.

Fla., Dade Co.—Voted $1,000,000 in bonds for Co. hgwys.

Fla., West Palm Beach—Voted $40,000 bonds pav.

Fla., Pensacola—City plans 14 blocks new paving, to be laid very soon.

Fla., Jacksonville—Considering the impv. of about 32 sts. in the city.

Fla., Tallahassee—State Rd. Dept. opened bids on constr. of 10 mi. of rd. in Duval and Nassau Cos. under Federal Project No. 32, State Rd. No. 4, also on 7 8-10 mi. on State Rd. No. 5 in Manatee Co., between Bullard's Creek and the Hillsborough Co. line.

Fla., Jacksonville—Petition submitted for impv. of 26th St., instead of 24th.

Ga., Atlanta—Fed. Govt. Forest Reserve plan for near future const. Toccoa Basin Rd., $40,000.

Ga., Atlanta—Resol. passed to pave North Ave., De Kalb Blvd., Grant St. and condemn brk. pav. on Thurmond St., Woodward Ave. and North Ave.

Ind., Kokomo—Bids by Bd. of Pub. Wks. for street impv.

Ind., Indianapolis—Bids rejected by Bd. of Pub. Wks., Chas. E. Coffin, City Hall, for street impv.

Ind., Allen Co.—State Bd. Tax Comrs. approved $362,000 road bond issue.

Ind., Brownston—$82,000 issue hgwy. impt. bonds.

Ind., New Albany—Bond issue $24,700 Macadam Rd. impvt. in county.

Ind., Franklin—$19,000 hgwy. impvt. bonds for sale.

Ind., Noblesville—A bond issue of $62,500 to be used in the constr. of the Scott Skinner Rd.

Ind., Indianapolis—Resol. adopted for vacation and impvt. on 15 sts. and alleys in city.

Ind., Indianapolis—Resol. passed to improve Washington St., from 538 ft. west of Harris St. to Big 4 Subway, conc. rdway.

Ind., New Albany—Bids by Bd. of Co. Comrs. New Albany for road to cost $4,300 in Floyd Co. M. M. Boland, Engr., Court House, New Albany.

Ind., Indianapolis—Marion Co. Comrs. will advertise for bids for const. of Claypool and Spring Mill Rd. when new est. has been prep. Old est. too hgh. $125,430.

Ia., Emmetsburg—Co. Comr. contemplate grading and graveling in Palo Alto Co.

Ia., Muscatine—Prelim. plans drawn for paving for City Council. J. J. Ryan, Engr. Will mature soon.

Ia., Sioux City—Woodbury County. Awarded to Lytle Investment Co., Sioux City, $400,000 paving bonds. Willis M. Pritchard, Co. Aud.

Ia., Marion—Linn Co. At election $1,000,000 rd. bonds failed to carry. H. R. Churchill, Co. Aud.

Ky., Covington—Drawing plans for City Council. H. G. Mieners, Engr., City Bldg.

Ky., Louisville—Co. Comrs. auth. issue of $35,040 Co. Hgwy. imp. bonds for const. Borden and Greenville Rd.

La., St. Lucie Co.—Has an appropriation of $67,554.50 for rds and bridge funds.

La., East Baton Rouge Parish—The Police Jury will vote Aug. 1 on $125,000 road bonds.

Md., Baltimore—State to issue bonds of $250,000 authorized for impv. of the Baltimore-Southern Maryland trunk line hgwy.

Md., Baltimore—Drawing plans for roads in various counties for State Hgwy. Comr., J. N. Mackall, 601 Garrett Bldg., Baltimore.

Md., Howard Co.—To issue $300,000 4½% public rd. bonds.

Mass., Boston—Ord. passed for widening Union St.

Mass., New Bedford—Comn. plans widening of Mt. Pleasant St.

Mass., Newburyport—Plans paving various streets. $100,000—City Hgwy. Dept., City Hall, Engrs.

Mass., Springfield—Survey prep. for two plans for st. impv. in Indiana Orchard and Sixteen Acres sect. Tentative plans for developments in various portions of city.

Mich., Lansing—Drawing plans for State Hgwy. Comr., Lansing, for roads in various counties.

Mich., Detroit—Drawing plans for City Dept. of Pub. Wks. J. W. Reid, Engr., City Hall.

Mich., Detroit—City Council contemplate paving alleys. J. W. Reid., Engr., City Hall.

Mich., Detroit—Having plans prepared with 3½-in. sheet asphalt on conc., Linwood Ave. from Burlingame to Ford Hgwy., $104,990; Hibbard Ave., $3,910; Pelouze Ave., $21,340; Burton Ave., $14,720; Farnsworth Ave., $9,780; Theodore St., $28,060; Visger Ave., $16,730; also 3 alleys with one course conc., totaling, $11,030.—J. W. Reid, City Engr.

Mich., Lansing—Resol. passed to pav. Ver Linden Ave. and const. sidewalks on Lenanee St.

Mich., Monroe—The Business Men's Association has endorsed the proposition to issue $100,000 paving bonds.

Mich., Portage Twp.—Macinac Co. (P. O. St. Ignace)—In July a $10,000 hwy. improvement bond issue will be voted.

Mich., Cass City—Voted $17,000 paving bonds.

Minn., Alba (P. O. Heron Lake)—Bids in June 29 for $25,000 rd. and bridge bonds. Check, 5 per cent. William P. Hesh, Twn. Clk., Alba, R. R. 3, Heron Lake.

Minn., St. Paul—Plans paving Raymond and Western Aves. from University to Como Aves., each 1 mi. long. $80,000—A. Claussen, City Engr.

Minn., Ortonville—Big Stone Co. Bids in June 27 for $49,717.40 hwy. reimburse bonds. Check, 5%. A. V. Randall, Co. Aud.

Minn., Minneapolis—Bids in June 14, for $731,565 st. impv. bonds, and $150,000 sewer bonds. H. N. Knott, City Clk.

Mo., Kansas City—Board of Pub. Works resolved to constr. conc. sidewalks on Monroe Ave.

Mo., Kansas City—To repair the asph. pav. on Bellevue Ave. from Roanoke Park to Valentine Rd.

Mo., Kansas City—Resol. to pave Colo Ave. from Budd Park to Smart Ave. with rock asph.

Mo., Kansas City—Ord. passed to pave about 30 sts., to open and widen Westport Ave. and curb and gutter Bales Ave., Michigan and Woodland Aves.

Mo., Cass Co.—Plans to offer $60,000 hwy. bonds soon.

Mont., Helena—Soon receives bids grading and paving Stuart St., Park and Barton Aves., 23,000 sq. yds. conc., bitulithic, penetration macadam, sheet asphalt or brick. $70,000—T. Carmichael, P. O. Box 398, City Engr.

Neb., Lincoln—Lancaster Co. plans paving 1½ mi. O St.—A. H. Edgren, Co. Engr.

Neb., Papillon—Ord. passed auth. paving bond issue.

Neb., Gibbon—Petn. submitted for change of Lincoln Hwy. through Buffalo Co. from Kearny to eastern boundary line.

N. J., Passaic—The City Clk. directed to advertise for proposals for repairing and resurfacing the sheet asph. pavement of Main Ave., between Howe Ave. and Harrison St. and Main Ave.

N. J., Passaic—An ordinance for the constr. of an asph. bound macadam pavement upon Howard St., between Main Ave. and Spring St., and the resetting of the curbs in conc.

N. J., Bayonne—An ordinance vacating portions of West 60th St., West 61st St. and West 62d St. in the City of Bayonne, N. J.

N. J., Blairstown—Ord. passed auth. issue Township Rd. No. 22 Impv. bonds for $2,500.

N. J., Warren Co. (P. O. Belvidere)—Ord. passed auth. issue of not exceeding 6% annual road impv. bonds, $2,500.

N. J., Hillside—Bids rejected for curb and laying sidewalks, etc., on Valley and Cross Sts. and 5 other sts.

N. J., Hoboken—Plan to pav. Jackson Ave.

N. J., Guttenberg—Ord. passed to impv. 27th and 25th St.

N. J., Hoboken—Oak St. paving has been opposed.

N. J., Jersey City—Notice given of proposed impv. at Hopkins Ave., Bramhall Ave. and Bevan St.

N. J., Jersey City—Ord. passed to widen Sip Ave. and Bergen Ave. to Grant St.

N. J., Montclair—Ord. passed auth. issue of st impv. bonds, $150,000.

N. Y., Mount Morris—Will vote $78,000 street bonds the latter part of June.

N. Y., Rochester—Plans and soon takes bids paving Werner Park, $17,000; Akron St., $22,000; Hazel St., $28,000; Sylvester St., $23,200; Violetta St., $12,000; Paige St., $13,400; Plymouth Ave., $46,000; Townsend St., $12,000; Rugraff St., $11,300; Penn St., $11,400; Bronson Ave., $18,600; Dewey Ave., $74,000; Chatham St., $45,000; Willow St., $7,500; Pavillion St., $8,150; Iceland Park, $8,400; La Mont Pl., $6,550; roads in Mt. Ave. from Fort to Chamberlain Sts., $16,980; Wilson Ave. from Blaine to Hazelwood Sts., $9,360; Davison Ave. from Jos. Campau to Conant Sts., $31,770; also 7 alleys with one course conc., totaling $23,955—J. W. Reid, City Engr.

N. Y., Niagara Falls—Plans paving 1,110 ft. Whitney St. between 24th and 27th Sts., brick, bithulithic, conc., sheet and block asphalt. $26,000. Estimate based on granite or wood block—W. B. Bennett, Convention Hall, City Engr.

N. Y., Brooklyn—Com. Finance pass resol. auth. $3,300 spec. rev. bonds for const. portion of rdway. pav. of Eastern Parkway.

N. Y., Albian—The election held May 31 to vote on $30,000 street paving bonds was carried.

N. Y., Clyde—Plans paving several streets, conc. $70,000—Engineer not announced.

N. Y., Elmira—Plans paving North Main, East Miller and Baldwin Sts., repaving North Main and Sly Sts. $450,000.—C. W. Jarchow, Clk.

N. Y., Salamanca—Plan pav. East State St., Wildwood and Nelson Aves., brk. and conc., $25,000.

N. C., Maiden—Prep. plans pav. var. sts., conc. and some asph., $50,000—Mees & Mees, Charlotte, Engrs.

N. C., Wilmington—Plan permanent st. for Castle St. from 6th to 17th St.

N. C., Stokes Co. (P. O. Danburg)—Co. Comrs. will issue $150,000 rd. bonds.

N. D., Mandan—Plans paving 6 blocks East Main St. $25,000—W. J. Seitz, City Clk.

Ohio—Dept. Highways and Pub. Wks., Columbus, rejected bids opened June 16, grading, bridging and paving 10.297 mi. Sect. "C-1" Painesville-Warren Rd., Ashtabula Co., monolithic brick or rein. conc. Noted June 22.

Ohio—Dept. Highways and Public Works, Columbus, rejected bids opened June 9, grading, bridging and paving roads in following counties:

Crawford Co., Sect. "G" Bucyrus-Cresline Rd., 1.69 mi., rein.-con., bituminous macadam, asphalt or tar, brick or state to furnish brick.

Licking & Knox Counties, Sect. "K" Columbus-Millersburg Rd., 1.42 mi., rein.-con.

Larain Co., Sect. "D" and "E" Cleveland-Elyria Rd., 6.23 mi., brick or bituminous macadam.

Tuscawaras Co., Sect. "Mineral City" Canton-Canal Dover Rd., 1.03 mi., Kentucky rock asphalt or brick. Noted June 15.

O., Belmont—Plans to issue $50,000 bonds to grading, curbing and paving 4,584 ft. Main, Bridge, Fair, 3d and Center Sts., brick, block or conc.—W. M. White, Clk.

O., Akron—Summit Co. takes bids in July or August grading and paving 3.64 mi. Sect. B-2 and C Vaugh-Twinsburg Rd., vitr. brick, conc, or bituminous conc.—J. Weaver, Court House, Engr.

O., Trenton—Plans being prep. to impv. Adams Lane.

O., Cleveland—The following paving projects are pending: Upper Sandusky—Salem township road improvements Nos. 107 and 108, bonds to be sold July 8, $3,286 and $6,920 respectively. Tiffin—S. Washington St., repaving, vote on $25,000 in bonds for city's share Aug. 8. Jackson—Pikes in Jackson Co. to be resurfaced at cost of $1,200. Hamilton—Elmer Ave extension, Bank to Woodlawn contemplated. Roseville—Street improvements, bond issue $3,200 passed. Zanesville—The South River Rd. in Wayne Township, est. $11,517, lack of bids, readvertisement probable. Georgetown—Mt. Oraba and Williamsburg Pike, Sterling Township, to be extensively repaired this summer. Ashtabula—Baker St., Council committee recommend paving, Mr. Cotton, City Mgr. Toronto—N. Fourth St., $15,000 bond ordinance for right of wall passed. Norwalk—Walnut St., $3,566 bond issue passed, brick, asphalt, conc. or similar material specified. Bucyrus—Lincoln Hgwy. from Leesville to the Morrow Lane. Co. Comrs. deny report that this work is to be deferred till next summer. Findlay—North Main St., bonds sold. Wapakoneta—Council submits $18,500 bond issue to voters Aug. 8 for paving city's portion of improving city gates on Dixie Hgwy, at N. Wood and S. Willipie Sts. Lima—Mile on Spencerville Rd. eliminated from 1922 State program, Lima Automobile Club, J. C. Hartline, president, working at Columbus with State Hgwy. Dept. for its reinstatement. E. Liverpool—Early construction of an improved river route between E. Liverpool and Beaver, Pa., via Midland and Vanport, is forecasted by Secy. H. B. Barth of the Chamber of Commerce. E. Palestine—Wellsville—Salineville Hgwy. between Highlandtown and Tidball Hollow, bids by commissioners to July 3. Delphos—Main St. at Middle Point to be graded and surfaced with tarvia. Findlay—County to sell $6,500 in bonds for Hancock Co.'s share for improvement of Main St. in Arlington. Columbus—Fifth Ave., Council authorizes City Engr. Geo. F. Turner to prepare legislation to resurface. (Note—This item should be Youngstown instead of Columbus.)

O., Columbus—W. H. Duffy, Dir. Pub. Serv., cancelled contract grading, curbing, laying water mains and paving 1,190 ft. Bruck St. from Markison Ave. to Hasack St. Will readvertise. Noted June 22.

O., Painesville—The voters upheld a bond issue of $120,000 for the constr. of a subway at the State St. crossing of the New York Central R. R.

O., Wilmington—Columbus St. property owners favor cement curb and gutter and tarvia coating.

O., Tiffin—Sycamore St. to be repaired.

O., Sandusky—City to act in the construction of the proposed Columbus Ave. subway.

O., Cleveland—The Co. Comrs. will lay before Pennsylvania, Wheeling & Lake Erie railroads and Northern Ohio Traction & Light line plans for the elimination of the dangerous grade crossing in Newburg Heights. The Co. Comrs. have also set aside funds for opening W. 54th St.

O., Middletown—Ordinance to proceed with the improvement of South Baltimore St., from Michigan Ave. to Heffner St., by the constr. therein of a tile storm and sanitary sewer and house connections.

O., Middletown—Ordinance to proceed with the improvement of Montgomery Ave., from Main St. to the Miami and Erie Canal by the constr. of cement sidewalk, curbing and gutters on the north and south sides.

O., Bucyrus—The county invite bids for paving on the Bucyrus-Crestline Rd. with brick. $75,000. State aid guaranteed to permit brick instead of conc.

O., Bellaire—W. 23d St. property owners protest against slag included in materials specified. Bids containing that material will have to be disregarded.

O., Galion—Harding Hgwy. in Morrow Co. Comrs. receive bids and will shortly award contr.

O., Lisbon — Columbiana-New Waterford Rd. brick surface to be laid.

O., Columbus—Plans drawn for paving in various counties for State Hgwy. Dept. B. R. Kenny, Engr., Court House, Chardon, O.

O., Lorain—Bids by City Council, W. F. Grace, City Hall, for paving.

O., Oak Harbor—Bids by Vil. Council, L. L. Carstensen, all of Oak Harbor. J. Hoffman, Engr., Toledo, O.

O., Findlay—Hancock Co. will sell $25,000 bonds to pave and improve North Main St.

O., Hicksville—Ord. passed auth. issuance of $7,500 5½% st. bonds.

O., Fredericktown—Ord. passed auth. $7,500 5½% semi-annual st. bonds.

O., Marietta—An ordinance has been passed auth. the issuance of $18,000 6% street bonds.

O., Jefferson—Ord. passed auth. issue paving bonds, $3,000.

O., Wellston—Ord. passed auth. issue of 6% J. & D., st. impv. bonds, $4,500.

O., Hamilton—Wm. F. Mason, Service Dir., has asked the Miami Concervaity Bd. to turn over to the city a portion of the land, will be voted in the August primaries, Oak Harbor pav. the rd. leading to the beach from the Toledo Rd. with conc., Virmillion pav. Division St. and South St.

Okla., Osage Co. (P. O. Pakhuska)—$1,500,000 hwy. bonds issue will soon be voted on.

Okla., Hughes Co. (P. O. Holdenville)—On July 11 a $500,000 road bond issue will be voted.

Ont., Milton..$8,000 sidewalks, water main, etc., bonds voted.

Pa., Johnstown—$81,013 approp. for impv. Westmont, East Taylor and Lower Yoder Rds.

Pa., Johnstown—Bids July 12 for Cambria Co. Rd. and bridge bonds, $500,000.

Pa., Kittanning—Bids by Boro Council, Ward McCullough, soon for street paving. Herbert & Henderson, Engrs.

Pa., Ebensburg—Croyle Twp. will hold mass meeting to urge proposed const. rds.

Pa., McKeesport—Ord. passed auth. $37,000 4½% 5-16 yr. sr. st. and sewer const. bonds.

Pa., Armstrong Co., Brady's Bend Twp. (P. O. Kittanning)—Recent election resulted in favor State road bond issue. (Amount not stated).

Pa., Butler—Ord. passed auth. issue of 4½% semi-annual paving bonds, $60,000.

Pa., Titusville—Ord. passed auth. an issue of paving bonds of $12,000.

Pa., Ebensburg—Approp. made for impv. 2,500 ft. hwy., $25,000.

Pa., Oriskany—Vl. Bd. considering impv. Utica St., $16,000, water bound macadam.

Que., Longueuil—An issue of pavement construction bonds $150,000.

Que., Hull—Voted $204,500 bonds for new pavements and sidewalks. T. Lanctot, city engr.

Que., Verdun—Takes bids about July 15, paving 1 mi. Verdun and Murlarkey Aves., bituminous macadam. $175,000. C. E. Gyshens, city engr.

R. I., Westerly—Shore Rd. opened by court. State may impv. rd. if assured of use of same.

Tex., Marlin—$100,000 aid given to Falls Co. to be used on Sap Hgwy. in Rosebud-Travis Rd. Dist.

Tex., Dallas—Bids early in July for const. Lancaster Rd., $350,000.

Tex., Starr Co. (P. O. Rio Grande)—Hwy. bond issue is being agitated. (Amount not stated).

Tex., Bryan—July 11 bonds issued $32,000 for street paving.

Tex., Denison—Special election July 26 on $65,000 for paving together with three other issues for municipal improvements.

Tex., Briscoe Co. (P. O. Silverton)—Election June 24 to vote an issue of 5½% Road Dist. No. 8 bonds of $2,000,000.

Tex., Lincoln—An election will be held in the near future to vote the issuance of st. pav. bonds. (Amount not stated).

Tex., Sanderson—Terrell Co. will sell $250,000 bonds July 1, highway improvements, incl. State Highway 12. State and Federal Aid will be requested. G. J. Henshaw, co. judge.

Tex., Brownsville — Cameron Co. voted $350,000 bond and plans additional highway improvements incl. completion of concrete highway between here and Hidalgo Co. line. W. O. Washington, co. engr.

Tex., McLean—City Council considering submitting to voters question of voting an issue of electric light, water works and street impv. bonds. (Amount not stated).

Utah, Salt Lake City—Fourth South St. viaduct destroyed by fire; $150,000 damage.

Utah, Ogden—Survey being prep. for widening Sevier-Cove Fort Rd.

Utah, Ogden—Plans being prep. for pav. Ogden Canyon dugway.

W. Va., Kanawha Co. (P. O. Charleston)—Malden Rd. Dist. bonds voted, $90,000.

W. Va., Charleston—City plans to pav. Bream St., Stockton St. and var. other sts.

Wis., Waupaca Co.—Hgwy. Comr. voted to const. conc. pavts. in Fremont Vil. this summer, $50,000; for repair of hgwys. damaged by recent rains, $75,000, for Brown Co.

SEWERAGE AND SANITATION

B. C., Kamloops—City Council passed by law providing for issue of sewer system bonds, $17,000.

B. C., Vancouver—$600,000 sewer bonds voted.

Cal., Los Angeles—J. A. Griffin, city engr., completed preliminary estimate for temporary plant for handling sewage now going into ocean. Plans include extension of sewers to treatment plant $100,000. 4 in. wooden pipe line $200,000, treatment plant $153,000, equipment, connecting pipe lines, etc., $47,000.

Cal., Morgan Hill—Plan sewerage system. J. G. McMillan, engr., Auzerais Bldg., San Jose, preparing estimate of cost.

Cal., Calipatria—Having plans prepared constructing 21,600 lin. ft. 6-12 in. vitr. pipe sewers in Assessment Dists. 2 and 3. $32,000. H. Tsheppe, city engr.

Fla., Inverness—$75,000 available for const. sewers 5 mi. and water mains 5 mi.

Fla., Miami Beach—Will vote July 25 on $125,000 sewer bonds.

Ind., Indianapolis—Bids July 11 for $500,000 bonds for san. dist.

Ia., Waucoma—Making plans sewerage system. $25,000. W. E. Buell & Co., 205 Davidson Bldg., Sioux City, engrs.

Ia., Cedar Rapids — Sewer — City council has passed ordinance for laying 6 in. sewer in Mt. Vernon St. from 24th St. to city limits. F. H. McCauley, city engr. L. J. Storey, city clerk.

Ia., Lamoni—Water works (imprs.) and extensions: Lamoni, Ia. Engr. Shockley Engr. Co., 800 Graphic Arts Bldg., K. C., Mo.

Ia., Oelwein—About 13,261 ft. of sewers and approx. 7,000 ft. of water mains will be constructed—E. B. Tourtellot, Engr.

Kans., Utica — Water Wks.: $15,000, Utica, Kans. Engrs. Ruckel Engr. Co., Hutchinson, Kans. Air lift pumping equip., conc. reservoir, steel tank and tower.

Kans., Chanute — Water Works (imps.): $125,000. Chanute, Kans. Engr. Black & Veatch, 701 Mutual Bldg, K. C., Mo.

Kans., Nortonville—Water works and sewers: Nortonville, Kans. Engr. Shockley Engr. Co., 800 Graphic Arts Bldg., K. C., Mo.

Ky., Henderson—Having preliminary plans prepared for sewerage system. J. A. Cunningham, comrs. Pub. Wks.

Md., Annapolis—Will vote July 17 sewer and st. impv. bonds, $72,000.

Md., Williamsport—Voters have authorized bond issue of $117,930.35 for extensions to city sewer system.

Mass., South Boston (Boston P. O.)—City of Boston plans rein.-con. overflow sewer in Farragut Rd. extension. $43,300. J. J. Carty, City Hall, engr.

Mo., Kansas City—Ordinance passed constructing district sewer 196, in Sewer Division No. 2.

Neb., Wayne—San. Sewer Extens.—Dist. 5. Contemp. J. S. Horney, City Clk.

Neb., Lincoln—Sewers—Ord. passed create sewer dist. 232. Theo. H. Berg, city clerk. Geo. W. Bates, Lincoln, engr.

Neb., Grand Island — Sewers — Ord. passed create Sewer Dist. 79 from Oak to Locust St. between 14th-15th Sts. H. E. Clifford, city clk.

Neb., Alliance—Sewer—Ord. passed create Sewer Dist. 39. Grace H. Kennedy, city clk.

Neb., Columbus—Sewers—Ord. passed to issue $5,000 bonds for main storm sewer in 23rd Ave., between 18th-21st. Henningson Engrg. Co., 3rd floor Natl. Bank Bldg., Omaha, consult engr. Wm. Becker, city clk.

Neb., Beemer—Sewers—Contemplate new system. City, care City Clerk.

Neb., Lincoln—Plan laying sewers in 20 blocks, Dist. 233, South St. from Normal to 52nd Sts., 48th, 49th and 50th Sts. from South to Glade Sts., 50th, 51st and 52nd Sts. from South to Summer Sts. G. W. Bates, city engr.

N. H., Manchester—$300,000 sewer bonds approved by Finance Com.

N. J., Jersey City—An ordinance to improve all that part of Lewis Ave. from a point about 690 ft. north of St. Paul's Ave., in the City of Jersey City, by the construction of a sewer.

N. J., Trenton—Making preliminary plans sewage disposal plant. $1,000,000. G. A. Johnson Co., 150 Nassau St., New York, engrs.

N. J., Collingswood—$250,000 sewerage bonds voted.

N. J., Trenton—Prelim. conference held for proposed const. sewage disp. plant, to be const. within 16 mo.

N. M., Artesia—Construction of sewer system at approx. cost of $500,000 is planned.

N. Y., Scottsville—Bd. Village Trustees rejected bids opened June 14, sewerage system, disposal works and water works system. Will readvertise. Noted May 29.

N. Y., Troy—Bd. approved plan to const. new sewer in Second Ave. from 124th to 125th St.

N. Y., Seneca Falls—Plans being prep. for sewer ext.

O., Bucyrus—Warren St., City Engr. Niederheiser recommends new sewer.

O., Bellaire—Residents of North Guernsey and 48th Sts. petition Council for a storm sewer.

O., Wapakoneta—Votes Aug. 8 on a $45,000 bond issue for the construction of sewers.

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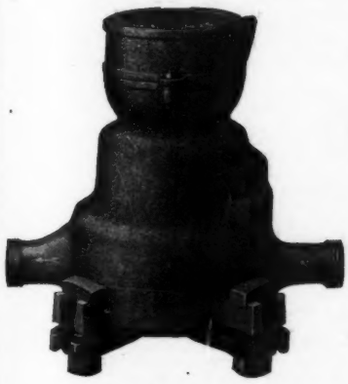

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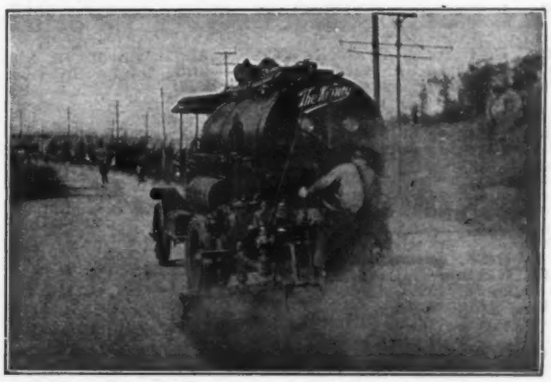

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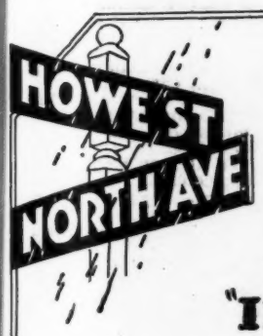

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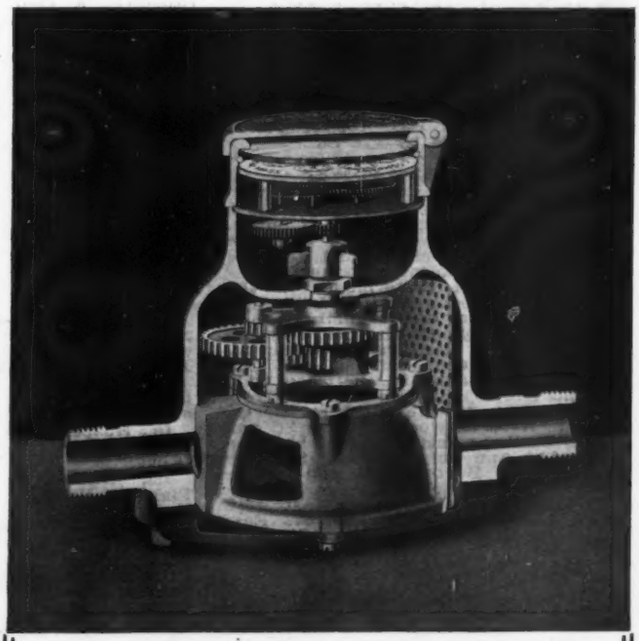

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O., Ironton—Sanitary sewer, declaratory resolution adopted.

O., Orrville—Barstow & Co., Engrs., of Akron, O., to make a thorough investigation and report on the sewerage situation.

O., Kenton—City Engr. directed to prepare plans for sewerage system in North Kenton district.

O., Middletown—Ordinance to improve Armco Ave., from Baltimore St. to Garfield Ave., by the construction of a tile storm and sanitary sewer and house connections.

O., Cincinnati—Investigation being made by State Bd. of Health into sewage overflow.

O., Columbus—Franklin Co. plans 8,000 ft. 15-24 in. vitr. sewer in 2nd alley east of Parson Ave. $27,750. E. G. Bradbury, 174 East Long St., engr. Noted June 15.

O., Akron—Plans intercepting sewer. $300,000 bonds sold. J. E. Root, Delaware Bldg., engr.

O., Akron—M. P. Tucker, dir. Pub. Serv., soon takes bids 24-66 in. brick sewer in Sweitzer Creek Dist., $100,000; remodeling present brick and concrete sewage disposal plant, $100,000. J. E. Root, Delaware Bldg., engr.

O., Marion—Will vote $525,000 sewer bond issue in August.

O., Middletown—Ord. passed auth. sewer, drain and ditch const. bonds, $6,500.

O., Columbus—It is proposed to build sanitary sewers at various places. $27,700.

Pa., Erie—The bonds issued to finance the proposed Myrtle St. sewer extension project.

Pa., Meyersdale—Elec. July 11 to vote $25,000 sewerage and st. impv. bonds.

Pa., Johnstown—Bids July 7 for $700,000 san. sewer bonds.

Pa., Sharon—Odr. passed auth. $33,500 sewer const. bonds.

Pa., Sharon—City plans bond issue for new sewer construction. L. E. Burnside, City Engr.

Pa., Erie—City plans construction of tile sewer in Cherry St. at estimated cost of $16,000. City has also ordered plans and specifications prepared for construction of sewers in various sts.

Que., Montreal—It is planned to const. 4,322 ft. 2x3 brick sewer in several sts. F. V. Dowd, Asst. Supt. Sewers.

R. I., Providence—Resol. passed adding $100,000 to approp. for sewers.

R. I., Woonsocket—Mayor ordered house connections with sewers in all streets.

Va., Radford—Having plans prepared and will soon vote on $95,000 bonds for sewerage system. W. E. Gilbert, mayor.

Wis., Whitefish Bay—$55,000 sewer impv. bonds passed by Vil. Bd.

LIGHTING AND POWER

Ill., Kewanee—Voted $125,000 5½% 20 yr. municipal lighting plant bonds.

Kans., Lawrence—Kansas Electric Power Co., of Lawrence, Kans., to issue $6,785,000 bonds to make extensive improvements and betterments in the service furnished, including Lawrence, Emporia, Parsons and Council Grove.

Ind., Indianapolis—The board ordered gas mains placed as follows: St. Paul St., between Fletcher Ave. and Hoyt Ave.; Koehne St., between Ohio St. and Saulcey St.; Dawson St., from Cottage Ave. to the third lot north; Cottage Ave., between Dawson St. and the first alley west; Kelly St., between State Ave. and No. 1622 Kelly St.; 28th St., between Burton Ave. and Schurmann Ave.; 47th St., between Carrollton Ave. and the first alley east; 40th St., from Ruckle St. to No. 543 East 40th St.; Hoyt Ave., btween St. Paul St. and Keystone Ave.; the alley north of Brookside Parkway, from Parker Ave. to 160 ft. west.

Mich., Kalamazoo—The Burns-McConnell Co., consulting engineers of Kansas City, Mo., have submitted an estimate that the city of Kalamazoo can erect a municipal gas plant for $2,348,658 which would pay for itself in 30 years at a rate of $1.20 a thousand feet.

Mich., Stanton—Will vote on $15,000 lighting system reconstruction bonds.

Mich., Kalamazoo—The city authorized an issue of municipal gas plant bonds to the amount of $3,348,658.

Minn., Willmar—To vote an issue of 5% semi-annual light plant bonds to the amount of $85,000.

Neb., Wahoo—issued power line bonds to the amount of $30,000.

Neb., Avoca—The State Aud. registered the following 6% 20 year bonds: electric light, $5,000.

Neb., Douglas—An issue of $5,500 electric light system bonds being considered.

Neb., Unadilla—An election will be held on July 6 to vote an issue of electric transmission line service bonds to the amount of $7,500. Due not later than 20 years.

Neb., Brunswick—To vote an issue of electric transmission line bonds. (Amount not yet determined.)

Neb., Unadill—Vote an issue of 6% electric bonds to the amount of $7,500.

N. C., Hobgood—Will sell $10,000 electric bonds.

N. D., Bismarck—Elec. Line—N. D. State R. R. Comsn, Bismarck, approved purch. of Lisbon Elec. Light plant and bldg. high line from Oakes to S. D. state line, by Midwest Power Co.

O., Upper Sandusky—City Council, Chamber of Commerce, Kiwanis Club and Mayor Bringman consulting on the public electric lighting.

O., Marysville — Council receives lighting estimate from Marysville Light & Water Co. running for seven cts. per k.w. hour to $56.65 per lamp per year.

Okla., Muskogee—Proposed an issue of electric generating plant bonds of $1,500,000.

Pa., Harrisburg—Fifteen bidders will receive plans and specifications for the proposed ornamental street lighting system at Carlisle.

S. D., Watertown—To vote an issue of light and power plant bonds.

S. D., Dell Rapids—Power House—Bids in July 6, 11 a. m. 2 stys., stone. Owner, Odd Fellows Home Bd., C. J. Bach, Chm. Archt., Jos. Schwarz, Sioux Falls, Chk. 2 per cent.

Va., Richmond—Has advertised for bids on excavating for and laying of a 12-in. gas main from the gas works to the West End holder.

WATER SUPPLY

Cal., St. Helena—$70,000 Water Co. impv. bonds voted.

Cal., Manteca—Election soon to vote on $40,000 bonds to purchase and improve privately owned waterworks system.

Cal., Vernon—Had preliminary plans 63,000 ft. 8-16 in. c.i. pipe, 1,500 gal. per min. motor driven turbine pump, cement lined reservoir, 3,000,000 gal. capacity, 3 centrifugal pumps, etc. $450,000. H. McCurdy, 335 Pacific Elecprepared high pressure water system, tric Bldg., Los Angeles, engr.

Conn., Berlin—Having plans prepared 3½ mi. extension to water supply system in Hudson St., Farmington Ave., Middletown Rd. and Worthington Bridge sections. Oldershaw & Crowley, 259 Main St., New Britain, engrs.

Conn., Manchester — Manchester Water Co. having sketches made new rein.-con. dam with 22 ft. spillway, concrete retaining walls. To exceed $25,000. J. F. Bowen, Manchester, engr.

Ida., Idaho Falls—Defeated $250,000 water works bonds by a vote of 437 to 585.

Ia., Villisca—Water tank. Plans in prog. Take bids soon for elevated steel water tank, 100,000 gal. capy. W. J. Dviatt, City Mgr. Theo. S. DeLay, Engr.

Ia., Storm Lake—Issuance of $40,000 bonds voted for waterworks improvements.

Ia., Hospers—Town has voted to improve waterworks system to extent of $8,000.

Ia., Wacoma — Waterworks, sewer. Plans in Prog. Consult. Engr., W. E. Buell & Co., 205 Davidson Bldg., Sioux City, just selected. City Clk., W. A. Hurd. Waterworks, est., $20,000; sewer, $25,000.

Ia., Coon Rapids—On June 12 voted $15,000 water works bonds.

Ia., Storm Lake—At elect. $40,000 water works bonds carried. Bids will be taken for same on June 8. Roy V. Kinne, Clk.

Ia., Waterloo—Making plans 2 rein.-con. reservoirs, rein.-con. slab covers, manholes, valves, aerators with screen house, etc. Mead & Seastone, State Journal Bldg., Madison, Wis., engrs.

Ia., Waucoma—Making plans waterworks. $20,000. W. E. Buell & Co., 205 Davidson Bldg., Sioux City, engrs.

Kan., Phillipsburg—City will lay 6½ mi. 8-in. mains, and construct purification plant, pumping plant, etc., $100,000. Black & Veatch, Mutual Bldg., Kansas City, Mo., engineers.

Md., Williamsport—Voters have authorized bond issue of $100,000 for construction of city water system.

Minn., Storden—Drawing plans for water works system. W. E. Buell & Co., Consltg. Engr., 205-7 Davidson Bldg., Sioux City, Ia.

Minn., Columbia Heights—Vil. Council contemplate ext. to water works system. Engr. not selected.

Minn., Montevideo—City Council,, P. O. Bonn, Clk., contemplate ext. to water main.

Minn., Edgerton—Council has decided to sink new well, purchase new pump and erect new pumphouse.

Minn., Barnum—Vote on proposed water and sewer improvement project carried.

Minn., Brainerd—Town will extend waterworks, $50,000. R. Campbell, City Engineer.

Minn., West Concord—Plans waterworks extensions, electrification of pumping plant, constructing pump house. $35,000. Toltz, King & Day, 1410 Pioneer Bldg., St. Paul, engrs.

Minn., Storden—Plans waterworks, $15,000. W. E. Buell & Co., 205 Davidson Bldg., Sioux City, Ia., engrs.

Minn., Fergus Falls—Special election July 11 to vote $30,000 water bonds. H. J. Collins, City Clk.

Minn., Annandale—Awarded to Wells-Dickey Co., McKnight Bldg., Minneapolis, $30,000 water sys. bonds. W. H. Towle, City Clk.

Minn., Princeton—At election $25,000 water sys. bonds failed to carry. C. V. Ossell, City Clk.

Minn., Red Wing—City Council will vote June 19 for approx. $50,000 water main bonds. S. T. Irvine, City Clk.

Minn., Springfield—At election $22,000 water works bonds carried. John Schmelz, City Clk.

Minn., North St. Paul—Plans waterworks extension and electrification of pumping plant. $60,000. Toltz, King & Day, 1410 Pioneer Bldg., St. Paul, engrs.

Mo., Eldon—$81,000 water works and sewer bonds voted.

Mo., Kansas City—City Council passed ord. approving $11,000,000 water bond issue.

Mo., Branson—Water works and sewers: $39,000. Engr. E. T. Archer & Co., 609 New England Bldg., K. C., Mo. Bond vote July 18 on $39,000 issue.

Mont., Conrad—Bond issue $180,000 for water impvts.

Mont., Toole Co—An issue of $223,000 6% irrigation coupon bonds sold.

Neb., Scottsbluff—Two pumps. Plans in prog. also for addn. to pump plant. J. W. Bly, City Clk.

Neb., South Sioux City—Pump. Contemp. Otto Anderson, City Clk.

Neb., Columbus — Waterworks improvs. Ord. passed to constr. steel tank and tower and elevated tank, improv. pump house. Wm. Becker, City Clk., $20,000. Engr., Henningson Engrg. Co., 3d flr., Natl. Bldg., Omaha.

Neb., Thurston—The $138,000 6% 5-20-yd. op. water bonds sold.

Neb., Central City—Waterworks. Ord. passed for laying pipes, connections, in various sections. C. F. Newmyer, City Clk.

Neb., Lincoln—Plans 3,180 ft. 6 in. and 2,760 ft. 4 in. pipe in Dist. 32, 48th St. from South to Glade Sts., Glade St. from 48th to 51st Sts., 51st St. from Glade to Normal Sts., Normal St. from 51st to 53rd Sts., 53rd St. from Normal to Myrtle Sts., Myrtle St. from 53rd to 56th Sts., 56th St. from Myrtle to South Sts. G. W. Bates, city engr.

Neb., Thedford—Ord. passed auth. issue of water bonds, $10,000.

Neb., Lincoln—It is planned to lay mains in District 30. G. W. Bates, City Engineer.

Neb., Columbus—Election July 17 to vote $30,000 water works bonds and $5,000 storm sewer bonds. Wm. Becker, City Clk.

N. J., Point Pleasant—Ordinance has been passed providing for extension of water supply system.

N. Y., East Syracuse—Plans new reservoir at Wright Brook, 1 mi. west of Jamesville, 1,000,000 gal. capacity, concrete spillway and wall, 4,500 yd. concrete and 30,000 cu. yd. earth excav. $100,000. S. L. Adcook, 109 West Ellis St., engr.

N. Y. Poughkeepsie—Sold bond issue of $554,000 for water system.

N. Y., Wilson—Sold $58,000 5½% water bonds.

N. Y., Scottville (Official report)—E. T. Swain, Vil. Clk., informs us that no bonds are for sale at the present time as bids on the water works were higher than the estimate.

N. C., Madison—Bonds amounting to $70,000 will be sold for construction of waterworks system.

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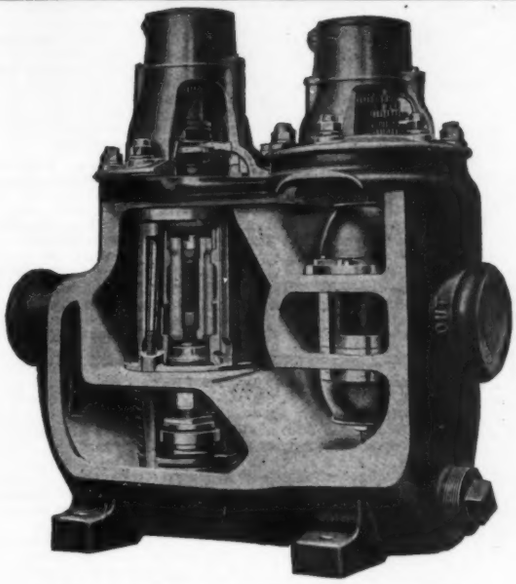

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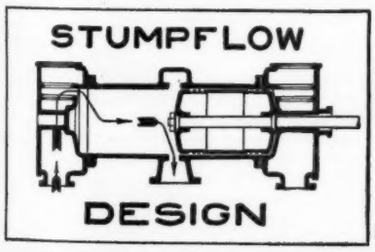

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O., Middletown—Ordinance to improve Montgomery Ave., from Main St. to the Miami and Erie Canal by laying and constructing therein 6-in. water pipe.

O., Bellaire — Ordinance passed authorizing installing water mains in various streets.

O., Rome—Franklin Co. plans laying 1½ mi. 6-in. pipe, pump and standpipe, also drilling 8-in. well, 175 ft. deep. E. T. Bradbury, Gugle Bldg., Columbus, Engineer.

Okla., McAlester — Water Works (imps.):$500,000 McAlester, Okla. Engr., Benham Engr. Co., 512 Gumbel Bldg., K. C., Mo. Owner, City of McAlester, E. M. Fry, City Mgr. Engr. just selected. Prelim. plans.

Pa., Lawrenceville—Waterworks system is planned.

S. D., Harrold—Closing date changed from July 10 to July 1 for $20,000 town bonds and $3,000 water main bonds. F. L. Hughes, Clk.

Tex., Pampa—City will construct waterworks plant; 75,000 gal. tank, 100 ft. high; daily capacity, 40,000 gals.; install two 10 h. p. motors and pump jacks.

Texas., Pompa—Bond issue of $80,000 for water works and sewage system.

Tex., Winters—Voted $30,000 bonds for waterworks improvements incl. raising of present dam 4 ft. and extending mains. Address Mayor.

Tex., Ysleta—$50,000 water works bonds voted.

Va., Richmond—Director of Public Utilities advertising for bids on the excavation for and laying of water mains in Broad St. from the Belt Line Bridge to what is known as Sauer Ave.

Va., East Radford—Voted $225,000 water and electric bonds. J. B. Murphy is manager.

Va., Strasburg—$50,000 water bonds voted.

Va., Ashland—$70,000 water bonds voted.

Wash., Walla Walla—Rejected bids opened June 6, constructing Div. 2 waterworks system, incl. 4 mi. 20 in. pipeline into Wenaha National Forest, gravity dam, 100 ft. wide, 16 ft. high, etc. Will readvertise at once. $140,000. E. B. Hussey, Alaska Bldg., Seattle, engr.

Wash., Tekoa—Ord. passed auth. $16,000 water works bonds.

W. Va., Cameron—Elec. July 11 to vote issue of water works bonds, $50,000.

Wis., Madison—Bids are being taken for $40,000 water works improv. bonds and $200,000 high school bonds. Harry C. Buser, City Clk.

Wis., Blue Mounds—Construction of waterworks system and reservoir under consideration.

FIRE

Columbia, Pa.—Keystone Truck & Chemical Co. decided to buy a new motor ladder truck. Collins, Miller, Smith and Zuch, Jr., are a committee to examine and report apparatus and report to the company.

Conn., Terryville—Voted to appropriate $25.000 to purchase suitable fire apparatus and to provide adequate housing facilities for same when purchased. A bond issue will be floated.

Md., Rising Sun—New fire company organized. R. C. Dodson, president.

Mass., New Bedford—Chief E. F. Dahill recommends purchase of land for sites for erection of fire stations. The city is urging purchase of two new city service trucks.

Mass., Pittsfield—New England Insurance Exchange engineer recommends in report purchase of 55-ft. combination city service ladder truck equipped with chemical tank, also purchase of hose wagon loaded with 1,000 ft. of 3-in. hose, the total supply of hose to be 13,000 ft.

Mass., Haverhill — Plans are being made to purchase an automobile combination fire truck for Salisbury Beach.

Mass., North Attleboro — Finance committee has named sub-committee to arrange for motorizing of entire fire department.

Me., Waterville—The purchase of a motor driven hook and ladder truck was authorized by the city government.

N. Y., Corning—Village without fire protection.

N. Y., Highspire—Council adopted resolution to purchase a new fire dept. engine to cost $8,000. Herman D. Long.

N. Y., Genesee Heights (Suburb of Syracuse)—Genesee Heights Improvement Association has asked for adequate fire protection.

N. C., Weaversville—Town is planning formation of fire department.

O., Mansfield—City without fire protection.

O., Lakewood—Mayor Hill recommended the construction of a new fire station at Newman and Madison Aves. to cost approximately $25,000.

O., Springfield—Purchase of new pumping engine for local fire department is contemplated.

O., Steubenville—It is recommended by Underwriters Association that twenty-six men be added to fire department and also that more equipment be purchased and station erected on hill top.

Ont., Stamford—City is planning on the purchase of fire siren signal for the South End Fire Hall.

Pa., Lancaster—The fire alarm system is in need of repairs.

Pa., Connellsville—It is recommended that fire hydrants and fire alarm boxes be installed.

Pa., Cresson—The Cresson Volunteer Fire Company is considering purchasing a truck to carry additional hose and men.

Pa., Lancaster—The fire department is in poor condition.

Pa., Wernersville—The fire company of this place will raise funds with which to purchase more hose.

Pa., Mapleton Depot—The firemen of this place held a festival recently to secure funds to buy new equipment.

Pa., Greenville—Borough Council has authorized the purchase of modern fire fighting apparatus. Address President of Council.

Pa., Reading—The Friendship and Riverside fire companies have received $1,000 each for purchasing of new fire apparatus.

Pa., Saltsburg—It is proposed to organize volunteer fire department.

Pa., Berwyn—It is reported that fire company is in need of better equipment.

Pa., Elizabeth—Bids received for equipping fire truck rejected.

Pa., Allentown—The Fairview Fire Company is raising funds for a new building.

Pa., Harrisburg—Work has been started on improvement to the Citizens Fire Company house.

Pa., Middletown—Campaign started to raise funds with which to purchase new motor apparatus.

Pa., Mt. Carbon—The firemen of this place are raising funds for a motor fire truck.

Pa., Middletown—The Liberty Fire Company is conducting a drive to secure funds to purchase fire apparatus.

R. I., Warwick—The Vigilant Fire Company of the Apponaug Fire District, is in need of a larger fire truck with a pumper.

R. I., Conimicut—The firemen of this town are considering improving the fire protection.

BRIDGES

Ala., Albany—A 160-ft. long conc. arch bridge is to be built across Shoal Creek, south of Hartselle on the Bee Line Hgwy. At Lacon, across Flint Creek, a five-span bridge is contemplated.

Cal., Hetch Hetchy—Modesto and Turlock Irrigation Dist, having plans prep. 10-span plate girder bridge, conc. piers, 640 ft. long, across six-bit. gulch on line of Hetch Hetchy R. R. $70,000. M. M. O'Shaughnessy, San Francisco, engr.

Cal., Stockton—Plans bridge over Mormon Channel. $35,000. W. B. Hogan, city engr.

Fla., Jacksonville—St. Johns Co. Comrs. rescind previous action to const. bridge over Julington Creek, connecting Duval and St. Johns Co. Both counties previously approved const. and plans have been approved by Washington.

Fla., Lake Worth—A bond issue for $100,000 to complete the bridge across Lake Worth was noted recently. A former bond issue of $300.000 was voted and the contr. was let, and the bridge was half done, when the three spans fell into Lake Worth and the contractor threw up the job.

Ida., Bear Lake—$55,000 bridge bonds voted.

Ia., Woodbury Co.—Will vote bridge, rd. and court house bonds in near future.

Mo., Saline Co. — $300,000 bridge bonds voted.

N. J., Trenton—Plans sub. for bridge on Craneer Ave.

N. Y., Kinderhook—$15,000 bridge bonds voted.

N. Y., Lackawanna—Plan re-conc. bridge, Abbott Rd. $30,000. B. R. McDonnell, comr. Pub. Wks.

O., Belleville—The State Hgwy. Dept. will award a contr. for the const. of a steel and conc. bridge across the Okaw River on the new road coming into Carlyle from the east. This bridge will consist of 18 40-ft. spans.

O., Piqua—Shortly to announce tentative plans for the const. of a new bridge across the Miami River at Ash St.

O., Newark—Co. Comrs. arranging to secure estimates on a new county line bridge between Licking and Perry Cos.

O., Youngstown—Instructions given the City Engr. to proceed with the preparation of plans for the const. of Belmont Ave. bridge.

O., Sidney—Ord. passed auth. $5,500 bridge const. bonds.

Okla., Woodward Co. (P. O. Woodward)—Pets. being circulated and will be presented to the Co. Comrs. for election August primary, to vote on an issue of bridge bonds. (Amount not stated.)

Pa., Harrisburg—The Co. Comrs. open bids July 19 for the construction of a bridge over Clark's Creek, at Strickler's, the structure to be of the one-arch type.

Pa., Dauphin Co. (P. O. Harrisburg) An issue of bridge bonds $250,000 is being considered.

Pa., East Liberty—(P. O. Pittsburgh)—Voted $105,000 bonds to repair four viaducts crossing Penn. R. R.

S. C., Charleston—$250,000 Fed. Aid granted for proposed conc. bridge across Ashley River at foot of Spring St.

Texas., Eagle Pass—Pontoon bridge planned across the river at Eagle Pass to replace temporarily the international bridge washed out by floods. The State Dept. telegraphed the American Embassy in Mexico City to take the matter up with Mexican officials.

Tex., Fort Bend (P. O. Richmond)—Will vote $100,000 bridge bonds July 1.

Tex., Dallas—City contemp. const. viaduct to Oak Cliff within the next five yrs. $1,000,000. Also new bridge at crossing of Forest Ave. has been suggested.

Utah, Ogden—Proposed bridge at Ogden Canyon considered.

Utah, Salt Lake—Repairs to viaduct damaged by fire at S. 4th St. will be undertaken soon.

W. Va., Clarksburg—Harrison Co. Comrs. call bids about July 15 const. bridges over Harbert Run, Robinson Run, Honepot Run, Branch and Little Camp Run, Patterson Fork and Branch Fork Hill Run, Buffalo Creek and Farmers Fork. $70,000.

MISCELLANEOUS

Ill., Chicago—Construction of $3,000,000 hospital for veterans on land adjacent to the Great Lakes Naval Hospital at Chicago was approved by the President on June 14.

Md., Baltimore—A 6-story municipally owned warehouse and pier, costing $3,000,000, soon to be erected at Locust Point by the city. This will constitute the first big harbor improvement by the city since passage of the harbor and loan and appointment of the Port Development Commission to prepare plans for development of Baltimore's waterfront.

New York—Charles L. Cadle submitted preliminary plans for the State development of water power at the barge canal dam at Crescent. This is the first step in the carrying out the improvement for which the legislature of 1922 made an appropriation of $1,000,000. The funds are also to cover the development at the Vischer Ferry dam. Plans have not been completed.

O., Toledo—This city acquired 19 acres of park land in the South Ave.-Swan Creek section. The strip will be developed at once.

O., Warren—A federal permit for the construction of a dam across the Mahoning River at Warren for sanitary purposes will be granted by the water dept.

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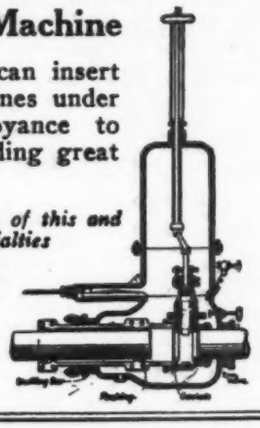

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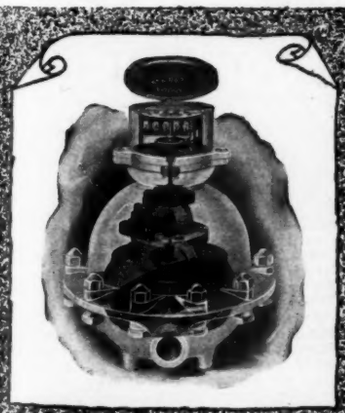

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STREETS AND ROADS

Ala., Mobile—City will issue $800,000 of 5 per cent. $500 denomination street bonds.

Calif., San Francisco—$200,000 will be spent in construction of 11 mi. of the Red Bluff-Susanville Rd. and $200,000 in construction of 6 mi. of the Cuyama Rd., both important links in the State hgwy. system.

California—$200,000 will be expended on construction of a 10 mi. section of the Crescent City-Grants Pass Rd. Thirteen mi. of highway will be constructed between Redding and Alturas at a cost of $200,000.

California—The Big Bear Valley project, 10 mi. in length, is estimated to cost $353,713.

California—Fifty mi. of roads in the forests of California costing $968,697 will be built from forest funds.

Fla., Tampa—It was decided to call an election to vote again on the $3,000,000 good roads bond issue July 28. The second election was rendered necessary by the invalidation of the election held June 20 for failure to properly advertise it. The bond issue carried in that election by over 1,000 majority. The original road building plan will not be changed.

Fla., Sanford—Sanford sold $325,000 of bonds. The money will be used for new streets, sewers, a municipal pier and dock and boat basin, library and many other improvements in the city.

Fla., Seminole Co.—Seminole county sold $100,000 worth of 30-year bonds. This money will be used to put asphalt on the roads recently constructed of sand-oil surfacing and to build a steel drawbridge across the St. Johns river at the Osteen ferry.

Fla., Miami—Dade county voted on issue of $1,880,000 in bonds for improvements during the next three years, the largest amount ever asked in the history of the county. $1,000,000 for constructing 80 miles of new highways.

Fla., Tampa—Hillsborough County voted $3,000,000 of road bonds.

Ga., Macon—Chamber of Commerce endorsed the proposed $75,000,000 bond issue for highway improvement in Georgia.

Ill., Cook Co.—Highways and rds. to be built in Bremen and Orland Twps.

Ill., Chicago—To improve roadway of North Mason Ave. from the northeasterly line of Norwood Park Ave. to a line parallel with and ten feet northeasterly of the southwesterly line of Milwaukee Ave. by adjusting sewer manholes and catchbasins, constructing and connecting catchbasin inlets, constructing a tile pipe sewer, constructing new brick catchbasins complete, constructing a concrete combined curb and gutter, adjusting abutting sidewalks and abutting pavements, grading, filling and paving with standard asphalt wearing surface and binder course.

Ind., Indianapolis—Impvt. resolution, Cornell Avenue, from north property line of 10th St. to south property line of 21st St., except at intersections of 11th St., 16th St. and 17th St.; Adams Street, from north property line of Brookside Parkway, North Drive, to south property line of 21st St.; Tuxedo Street, from north property line of St. Clair St. to north property line of Pratt St. By grading and paving the roadway with wooden block, asphalt, bituminous concrete or brick laid on a six (6) inch gravel concrete foundation from curb line to curb line to a uniform width of twenty-four (24) ft.; grading and paving the wings of the intersecting street in a similar manner and to the widths shown on plan; providing seventy-two (72) lineal feet of 4x18 inch stratified limestone marginal stone; reset two (2) manhole tops to grade.

Ind., Columbia City—Whitley county, for sale, $13,600 and $6,400 highway improvement bonds, five per cent, ten years.

Md., Baltimore—Widening of Edmondson avenue in three sections between Allendale road and Old Edmondson avenue. The proposed widths are: Between Allendale road and Collins avenue, 114 feet, between Collins avenue and Swann avenue, 120 feet, between Swann avenue and Old Edmondson avenue (along the right of way of the United Railways and Electric Company), 150 feet. The engineers also decided to widen the Old Frederick road to 50 feet between Hilton street and the old city line.

Mich., Detroit—City to improve Yosemite Ave., Renville Ave. and Monroe Alley by repaving.

Minn., St. Paul—Proposal for following improvement: Pave Otis Ave. from Marshall Ave. to Dayton Ave., including sewer, water and gas connections from street mains to property lines complete, where not already made, also including curbing and paving alley and driveway approaches. Open, widen and extend Gorman Ave. to a width of 60 ft., from Annapolis St. to Wyoming St.

Minn., Fergus Falls.—Grad. Ottertail Co. All bids rejected. Bidders: Dakota Central Contr. Co., $21,348; G. H. Clear & Co., Fergus Falls, $21,527; N. J. Nolan Contr. Co., $22,807; culvts., Fergus Falls Tile Works, $1,057; North Dakota Contr. Co., Fargo, $1.081. William Lincoln, Co. Aud.

Minn., St. Paul—Resolution to construct a 6-ft. cement tile sidewalk on the east side of Syndicate Ave. from University Ave. to St. Anthony Ave.; reconstructing, relaying and repairing, where necessary, the cement tile sidewalk at the following locations: North side of Litchfield Ave. between Rice St. and Park Ave., north side of Fairmount Ave. from Finn St. to Cretin Ave.

Mont., Park Co.—Will build 13 mi. of general surfacing on the Livingston-Wilsall Rd. The State will go ahead as soon as Park County furnishes the right-of-way. Paving three-fourths of a mile through Belgrade. Bids will be called for about July 10.

Mont., Cascade Co.—Ten miles on the Belt-Riceville route in Cascade Co. The advertisement for proposals will go out about July 10.

Mo., Gallatin—Resolutions calling for the paving of nine of the principal streets of the city and contracts may be awarded soon.

Mo., Kansas City—City to improve 48th St., Houston Ave., Grove, Oak, 17th, 14th, Summit St., Agnes Ave. and others by re-establishing grade and paving.

N. J., East Orange—Notice of intention, East Orange, the improvement of railroad place by paving the roadway.

N. J., East Orange—The improvement of North Munn avenue by paving the roadway.

N. J., East Orange—Dodd street repaving, between Prospect street and the Bloomfield town line; Rutledge avenue extension, from present southeasterly terminus to Hoffman boulevard; Fourth avenue extension, from North Grove street to North Arlington avenue. The City Council has fixed the 24th.

N. J., East Orange—Notice intention of the vacation of Oliver street, the improvement of prospect Place by paving the roadway.

N. J., Newark—Belleville avenue and Bloomfield avenue opening and widening; High street opening and widening; with retaining wall.

N. J., Newark—Chancellor avenue, opening and widening, Jefferson street opening, Dewey street paving, Mt. Prospect avenue, Parker street resurfacing; Goodwin avenue grading, curbing and flagging; Belgium street paving, and Silver street paving and repaving.

N. J., Bloomfield—The opening and widening of Belleville avenue and Bloomfield avenue at the southwesterly and northwesterly corners thereof by the addition thereto of two triangular strips. Adopted February 10, 1921.

N. Y., Boro. Manhattan—Plans to change lines and grades of Minuit Pl. from West 187st St. to Bennett Ave., Boro. of Manhattan.

N. Y., Boro. Manhattan—Plans to adjust lines and grades of the street system within the territory bounded by West 155th St., Harlem River Driveway (Speedway) and the Harlem River, including the establishment of lines and grades for River St. from the intersection of 7th Ave. with West 155th St. to the Harlem River Driveway (Speedway)) at a point approximately opposite West 164th St., Boro. of Manhattan.

N. Y., Boro. Brooklyn—Change of grade of Beadel St. from Kingsland Ave. to Morgan Ave. and Debevoise Ave. from Beadel St. to Division Pl., Boro. of Brooklyn. Howard Ave. from Eastern Parkway to Pitkin Ave. and Lincoln Pl. from Howard Ave. to Eastern Parkway, Boro. of Brooklyn.

N. Y., Boro. Brooklyn—To change grade of East 15th St. from Avenue V to Avenue X, and of Gravesend Neck Rd. from East 14th St. to East 16th St.; Battery Ave., 92d St. and 7th Ave., including provision for closing and discontinuing Warehouse Ave. between Battery Ave. and the intersection of Poly Pl. and 7th Ave.

N. Y., Boro. Bronx—City to change lines and grades of the street system within the territory bounded by Bussing Ave., Grace Ave., Pitman Ave. and Wilder Ave., Boro. of The Bronx; Sound View Ave., Taylor Ave., Seward Ave., Underhill Ave. and Lacombe Ave., Boro. of The Bronx.

N. Y., Boro. Brooklyn—Citizens petition to Board for improvements to Empire Boulevard, Lefferts Ave., Crown St., Schenectady Ave. and East 28th St., Boro Brooklyn—grading, curbing, flagging, paving and sewer.

O., Panedug Co.—To sell $47,700 bonds for the purpose of improving the Ft. Wayne-Findlay road No. 36, Sections "E" and "F" in Latty Township, and being six miles in length.

O., Toledo—To issue $125,000 of street extension bonds.

O., Cleveland—Res. adopted to grade, drain, curb, pave and improve E. 145th St. from Kingsman Rd. S. E. to Milverton Rd. S. E.; improve W. 9th St. from Brayton Ave. S. W. to Fruit Ave. S. W.; grade, drain, curb, pave and improve W. 48th St. from Memphis Ave. S. W. to Ardmore Ave. S. W.; grade, drain, curb, pave and improve Argus Ave. N. E. from E. 133d St. to E. 140th St.

O., Cleveland—Grading and other improvements on a 38-acre allt. in Lakewood by the C. O. Frick Co., Marshall Bldg., Cleveland.

O., Columbus—Paving a number of streets in the village of Grandview Heights.

O., Warren—Paving the road from Bristol to the Bloomfield Twp. line., on which bids are to be opened July 14 by the State Highway Dept.

O., New Philadelphia—Paving Road No. 507, I. C. H., for which plans by County Engr. Fiedler have been approved.

O., Barberton—Resurfacing High St. at an estimated cost of $12,470.

O., Warren—Many streets. The City Auditor will sell several issues of bonds aggregating $120,000 in anticipation of property owners' share of expense.

O., Kenton—North Wayne St., sidewalks; North Lima St., resurfacing, resolutions introduced.

O., Galion—Bucyrus-Crestline Rd., commissioners contemplate deferring till next year.

O., Lima—Elm and Pine St. bridges; City Manager C. A. Bingham demands quick action of County Commissioners in paving these.

O., Bucyrus—Paving the Leesburg Rd. with brick.

O., Bellefontaine—North Madriver St.; petition for paving filed.

O., Akron—Summit Co. to issue bonds of $74,500 for the purpose of improving Section "D" of the Brittain-Massillon road, C. H. No. 49, Green Township, Summit County, Ohio.

Ohio, Summit Co.—Issue of $35,600 bonds to improve Section "B-1" of the Cuyahoga Falls-Hudson road, C. H. No. 34, Stow Township, Summit County, Ohio.

Okla., Medill—Marshall County Commissioners plan to build sixty-five mi. of hard surface highways in Marshall County, a $350,000 bond issue voted.

Pa., Phila.—Plans and specifications have been drafted and proposals will be opened by the Department of Public Works on July 11, for paving and repaving almost six miles of streets, and making other highway improvements, involving an expenditure of about a half million of dollars. Eight streets are to be graded. They are: Almond street, from Tioga to Venango street; Mercer street, from Tioga to Venango street; Schiller street, from Thompson to Richmond street; Thompson street, from Tioga to Venango street; Flor-

ence avenue, from Fifty-fourth to Fifty-fifth street; Springfield avenue, from Fifty-fourth to Fifty-sixth street; Fifty-fifth street, from Florence to Warrington avenue; Stillman street, from Thompson to Master street. The new streets to be paved with asphalt are as follows: Chester avenue, from Sixty-fifth to Sixty-sixth street; Filbert street, from Fifty-second to dead end; Fisher avenue, from Fifteenth to Sixteenth street; Franklin street, from Wyoming avenue to Louden street; Hutchinson street, from Ruscomb to Lindley avenue; Madison street, from Cedar to Aramingo avenue; Mercer street, from Westmoreland to Ontario street; Percy street, from Emily street to Snyder avenue; Snyder avenue, from Twenty-third to Twenty-fourth street; Tower street, from Roxborough avenue to Jamestown street; Woodlawn street, from Ardleigh to Sprague street; Fifty-first street, from Viola to Leidy street. In addition, the paving includes Fifty-eighth street, from Woodland avenue to Baltimore and Ohio Railroad, with redressed granite block, and the following streets are to be repaved with asphalt; Marshall street, from Brown to Poplar street, and Sigel street, from Seventh to Eighth street. Indiana avenue, from Broad to Fifteenth street, is to be repaved with redressed granite block.

Pa., Phila. — An important county road improvement is to be made in Brewster avenue from Eighty-third to Eighty-sixth street, a section which has long required attention.

Pa., Mechanicsburg—Council passed ordinance for the paving of South Market street from Simpson street to borough limits. Notices will be posted on the street to be paved.

Pa., York Co.—Proposed issue of $1,000,000 road bonds of the series of 1922.

Tenn., Cleveland—Drawing plans for paving to cost about $50,000 for city council, L. L. Woolen, City Hall.

Tex., Fort Worth—Tarrant county commissioners plan to construct seven miles of highway to cost $120,000, with Federal aid.

Tex., Haskell—Plans to improve and pave the streets in town.

Tex., Lufkin—Road: $90,000. Engr., C. A. Abney. Owner Angelina County, John F. Robinson. Gravel and conc. Bids to be received in near future.

Tex., Johnson—$225,000 in a shoe string district for Highways No. 2 and No. 2-E carried by a large majority with 2,289 for and 276 against.

Va., Richmond—Richmond will appropriate $25,000 to take care of the interest on a loan of $200,000 proposed for the completion of the highway from Hampton Roads to this city.

Wash., Seattle—H. C. Rolfe, 1509 Hoge Building, issued a call for bids for clearing, grading, grubbing and draining approximately 1,200 feet of roadway at Rolfe's Evergreen Point tracts. The grade of the ground to be improved is about 5 per cent.

Wash., Seattle—Street and road contractors' figures for projects in Seattle approximating an expenditure of $243,151, involving paving, concrete walks, sewers, etc. The largest contract on which bids will be opened calls for the paving of Wilson avenue. This improvement will cost $140,598. The smallest improvement contract of the eight projects for the paving and installation of sewers in Woodrow place. This work is estimated to cost $3,119. A complete list of the various contracts follows: Twenty-fifth avenue north et al, paving, est. cost, $17,549; Forty-fourth avenue southwest et al, concrete walks, est. cost, $20,617; Wilson avenue et al, paving, est. cost, $140,598; Sycamore avenue et al, paving, est. cost, $17,217; West Andover street et al, water mains, est. cost, $2,814; Thirty-second avenue south et al, sewers, est. cost, $36,845; Woodrow place, paving and sewers, est. cost, $3,119; Alley, block 5, Randell's addn., paving, etc., est. cost, $3,392.

Wash., Seattle—Res. passed to improve Nob Hill Ave., from the south line of Mayfair Addition to Fulton St.; 3d Ave. North, Mayfair Ave., 2d Ave. North, Warren Ave., 1st Ave. North, Queen Anne Ave. and 1st Ave. West, each from Ray St. to Florentia St.; Newell St. and West Newell St., from 4th Ave North to 1st Ave. West; Armour St. and West Armour St., from 1st Ave. North to 1st Ave. West; Fulton St. and West Fulton St., from 4th Ave. North to 1st Ave. West; Florentia St. and West Florentia St., from Nickerson St. to 3d Ave. West; Ray St., from 1st Ave. North to 2d Ave. North; all in the City of Seattle.

Wash., Seattle—City Council to order the improvement of 11th Ave. North, from Roanoke St. to Shelby St.; Shelby St. and Hamlin St., each from 10th Ave. North to existing pavement on 12th Ave. North; West Lander St. (southwesterly 45 feet), from East Marginal Way to East Waterway, by paving, including as a part of work the construction or reconstruction of all sewers, side sewers and watermains with appurtenances.

Wash., Raymond—A party of engineers arrived here from Olympia. They will establish a camp on the line of a proposed highway to connect this city with Aberdeen and survey and stake out that portion of the road in this county. The Gray's Harbor county end of the road is nearly completed.

Wash., Seattle—City Council to order the improvement of Findlay St. and Lucile St., each from 42d Ave. South to 46th Ave. South.

Wis., Superior—To Minnesota Loan & Trust Co. N. W. Bank bldg., Minneapolis, $90,000 street bonds. M. G. Beckley, City Clk.

Wis., Oshkosh—City council will vote July 18 on $200,000 school bonds.

Wyo., Sheridan—Bids in July 10 for $11,000 pav. bonds. Owner, Pav. Dist. 15, A. L. Helf, City Clk.

SEWERAGE AND SANITATION

N. Y., Boro. Bronx—Board of Local Improvements plan regulating and reregulating, grading and regrading, paving, setting and resetting curb, laying and relaying sidewalks and crosswalks, building inlets, receiving basins, drains, culverts, approaches and guard rails on East 149th St., from Timpson Pl. to the New York, New Haven & Hartford R. R.

Pa., Phila. — Plans for seventeen branch sewers prepared and proposals for their construction opened. The sewers will be located in different sections, will have a total length of three miles. Five of the sewers to be built in McKean street from Swanson street to Delaware avenue, Schiller street from Thompson to Richmond, Tulip from Cottman to Friendship, Twelfth street from Thompson street to Columbia avenue and Second street from Chew street. The remaining sewers will be located in American street from

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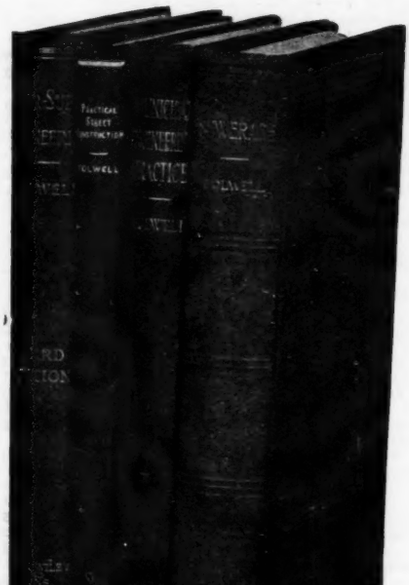

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WYOMING .....(one highway: 4.68)
YATES .....(one highway: 2.92)

ALSO FOR THE RECONSTRUCTION OF THE FOLLOWING:

CHENANGO .....(one contract: 1.27)

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the division engineers in whose division the roads are to be improved or reconstructed. The addresses of the division engineers and the counties in which they are in charge will be furnished upon request.

The especial attention of bidders is called to "General Information for Bidders" in the itemized proposal, specifications and contract agreement.

HERBERT S. SISSON, Commissioner.
J. C. FINCH, Secretary. (25-1-2)

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., June 28, 1922.—SEALED PROPOSALS will be opened in this office at 3 p. m., July 24, 1922, for New Sanitary Sewer, etc., at the United States Post Office and Custom House at Eagle Pass, Texas, in accordance with specification and drawing, copies of which may be had at this office or at the office of the Custodian, Eagle Pass, Texas, in the discretion of the Supervising Architect. Jas. A. Wetmore, Acting Supervising Architect. (2-3)

Luzerne street to Hunting Park avenue, American street from Chew street to 303 feet north, Charles street from Harrison to Wakeling, Delphine street from Third to American, Eastburn avenue from Wister street to Garry, Fourth street from Chew to Grange, Fourth street from Grange street to Nedro avenue, Garry street from Sixty-sixth avenue to Eastburn avenue, Grange street from Fourth street to 190 feet east of Third, Henley street from Manheim to Hansberry street, and Marshall street from Bristol to Cayuga.

Pa., Erie—Ordinances providing for two sewers passed by city council. The estimated cost of the improvements is $15,500. The first sewer in Cherry street from the center line of Thirty-second street southwardly to the center of Peach street, at the intersection of Cherry street. The second sewer in Cherry street from the center of Peach street to Grandview boulevard. The first improvement is estimated to cost $6,200 and the second $9,300.

LIGHTING AND POWER

Md., Laurel—Will receive bids for the following 5 per cent bonds aggregating $10,000: Electric light, $2,000; Main St. improvement, $3,000; sewage disposal, $5,000.

Minn., Duluth—Awarded to Stacy & Braun Co., Chicago, Ill., $250,000 water and light bonds.

Mont., Miles City—Power dam, power house. On Yellowstone River at Buffalo Rapids, near here. Permission granted. Jos. B. Leighton. 15,000 h. p.

Neb., Douglas—Special election July 11 to vote $5,500 elec. light sys. bonds. Care, City Clk.

N. D., Grand Forks — Power line extens. Contemp. to Hillsboro. Owner, Red River Power Co., W. H. Brown, Gen. Mgr. Consult. Engr., H. M. Byllesbye, 208 S. La Salle, Chicago, Ill. R. M. Stanley, Engr. Walter Jens, 5321 Stevens Ave., Minneapolis, Minn., in charge.

HIGHWAY WORK
OFFICE OF THE STATE COMMISSION OF HIGHWAYS

Sealed proposals will be received by the undersignd at their office, No. 55 Lancaster Street, Albany, N. Y., at one o'clock p. m., advanced standard time, which is twelve o'clock noon, eastern standard time, on Friday, the 21st day of July, 1922, for the improvement of the following in Cattaraugus County:

Highway No. 8018-A.—Bradford-Carrollton, Part 2 (Carrollton Bridge). The work to be done under this contract includes seven spans of steel trusses weighing approximately 1,150,000 lbs. with six concrete piers and two abutments. The approximate length of steel structure is 895 feet, and the roadway is 20 feet in width, surfaced with wood block on a reinforced concrete floor.

ALSO FOR THE IMPROVEMENT OF THE FOLLOWING HIGHWAYS:

Allegany .....(two highways: 2.77 & 8.35)
Fulton .....(one highway: 4.23)
Oneida .....(one highway: 2.75)
St. Lawrence .....(one highway: 7.73)
Steuben .....(one highway: 1.01)
Wayne .....(one highway: 1.65)

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the division engineers in whose division the roads are to be improved. The addresses of the division engineers and the counties in which they are in charge will be furnished upon request.

Thre especial attention of bidders is called to "General Information for Bidders" in the itemized proposal, specifications and contract agreement.

HERBERT S. SISSON, Commissioner.
J. C. FINCH, Secretary. (2-3)

Pa., Carlisle—Plans and specifications of the proposed modern street lighting system at Carlisle, together with contracts, will be sent to fifteen electrical contractors, who will bid on the installation of the system.

S. D., Aberdeen—Transmission line. Franchise granted to constr. bet. here and Groton. Wk. to start at once. Aberdeen Light & Power Co.

WATER SUPPLY

B. C., Vancouver—Eight tenders from leading contracting firms all along the Pacific Coast and Western Canada received by the directorate of the Pacific Mills, Ltd., on the construction of the big water storage dam at the company's mills at Ocean Falls, on Cousins inlet, Dean channel, about 349 miles from Vancouver.

Fla., Vero—Vero's $68,000 water works bond issue was sold for $69.000 flat. Sale of the water works bonds which were issued in 1920, means that Vero will have a modern water works plant. Plans and specifications for the entire system have been prepared by Engineers Carter & Damerow, of Vero, and the council will shortly call for bids for its construction. The system will include a water softening plant, elevated tower, electrically driven pumps, fire plugs and water mains to all parts of the city. Deep artesian wells will furnish the water supply, which when aereated and softened is as fine water as can be obtained.

Ind., Hammond—The Indiana Public Service Commission gave permission to the Hammond Water Works Company to float an additional $175,000 bond issue for improvement and extension of its mains.

Ia., Belle Plaine—Awarded to White & Phillips, Putnam Bldg., Davenport, $50,000 water bonds. H. C. Parsons, City Clk.

Minn., St. Cloud—Awarded to Minnesota Loan and Trust Co., N. W. Bank Bldg., Minneapolis, $50,000 waterworks bonds. A. W. Buckman, City Clk.

Mont., Glendive — Special election July 7 to vote $60,000 water bonds. August Colin, City Clk.

Neb., Columbus—Election July 11 to vote $35,000 waterworks and storm sewer exten. bonds. Wm. Becker, City Clk.

EQUIPMENT BARGAINS

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Marine Metal & Supply Co.
167 South St., N. Y. City
137-147 Fifteenth St., Jersey City

Ore., Coquille—The Rink Creek storage project and improvements to the water works system at Coquille consists of an earth and rock fill dam, containing approximately 18,300 cubic yards, clearing and grubbing and stripping reservoir site, about 12 acres in extent, spillway lining, miscellaneous piping, valves and appurtenances, all complete and ready to use.

S. D., White River—Special election soon to vote $28,000 waterworks sys. bonds. Care, City Clk.

S. D., Murdo—At election $35,000 water sys. bonds carried. Care, City Clk.

Wash., Seattle—An ordinance to improve Fifteenth Ave. West by the construction of water mains and fire hydrants in Local Improvement District No. 3533.

BRIDGES

N. J., Hackensack—Temporary bridge to replace the one wrecked last week, 40 ft. long.

N. D., Mandan—Viaduct. Petn. ciculated for foot bridge viaduct over R. R. yds. Northern Pacific R. R. Co., 5th and Jackson Sts., St. Paul, Minn.

Pa., Dauphin Co.—Commissioners received permission to construct a single span concrete girder bridge across the south fork of Powell Creek, two miles west of Carsonville, Jefferson county.

Pa., Fulton Co.—Granted permits for construction of a two-span concrete girder bridge across the Cove Creek, a mile south of Big Cove Tannery post-office in Ayr Township; and a single span bridge of the same type across Woodenbridge Creek, in Taylor Township, a mile south of Clear Ridge post-office.

Tex., Bowie Co.—Issue $65,000 bridge bonds. These bonds mean that three bridges will be built without delay across Sulphur river, south, southwest and west of here, connecting this section with as many good roads to such points as Shreveport, Longview, Dallas, Mount Pleasant, Paris, Clarksville and other points. The bridges will cost about $100,000 each.

Wash., Yakima—A steel bridge to replace the wooden structure across the Yakima river at Parker will be built this year by the O. W. R. & N. Co. Steel has been ordered for the new bridge, which is to cost $250,000.

Wis., Sparta—Bridges—Monroe Co. To take bids later on several small r. c. bridges, various rds. Chas. Millard. Co. Hgwy. Comsr.

Wis., Eau Claire—Bridge—On Madison street. Voted to issue $80,000 bonds to pay city's share of cost. County and state to pay one-third. Plans by State Hgwy. Comsn. Will complete this fall. Total cost $240,000.

Wis., Merrill—Bridge—Will call for bids soon, 3 70 ft. r. c. deck girder spans, over Wisconsin river on West Main street.

MISCELLANEOUS

Va., Norfolk—A coal pier to cost $3,000,000 will be built by the Virginian Railway at Sewells Point, it was announced today. Work on the pier will begin within two or three months and will require two years for completion.

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Consulting Engineers
Appraisals — Expert Testimony
Sewerage — Rate Investigations
Water Works — Lighting
Clinton S. Burns R. E. McDonnell
Kansas City Inter-State Bldg.

CAIRD, JAMES M.
Assoc. Am. Soc. C. E.
Chemist and Bacteriologist
Office and Laboratory:
92 Fourth Street, Troy, N. Y.
Water Analysis and Tests of Filter Plants

COLLINS, JOHN L.
Consulting Civil & Sanitary Engineer
Water supply and PURIFICATION
SEWERAGE and SEWAGE DISPOSAL
Plans, Estimates and Supervision of Construction
30 Church Street, New York City

DAVIS, B. H.
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BUYERS' CLASSIFIED DIRECTORY

of Names of Firms from Whom to Buy Material, Appliances and Machinery Needed by Public Works Departments and Contractors

CONTRACTORS' EQUIPMENT
(See Paving Machinery also)
Asphalt Block Press
Nat'l Moulding Press Corp.
Air Compressors
Ingersoll-Rand Co.
Schramm, Chris. D., & Son
Sullivan Mchy. Co.
Air Compressors, Portable
Ingersoll-Rand Co.
Ash Handling Mach.
Blaw-Knox Co.
Angle Splice Bars
Sweet's Steel Co.
Asphalt Block Press
Nat'l Moulding Press Corp.
Backfillers
Pawling & Harnischfeger Co.
Bar Benders
Ransome Concrete Mach. Co.
Bar Cutters
Ransome Concrete Mach. Co.
Bins
Ransome Concrete Mach. Co.
Blasting Powder
Atlas Powder
Du Pont de Nemours Co.
Bolts, Tee Head
Sweet's Steel Co.
Braces, Trench
The Duff Mfg. Co.
Bridges
American Bridge Co.
Blaw-Knox Co.
Russell Grader Mfg. Co.
Truscon Steel Co.
Bridge & Wharf Timbers (Creosoted)
Wyckoff Pipe & Creo. Co., Inc.
Buckets, Automatic & Dumping
Blaw-Knox Co.
Ransome Concrete Mach. Co.
Buckets, Clam Shell
Dragline, Orange Peel
Blaw-Knox Co.
L. P. Green
Russell Grader Mfg. Co.
Cableways
Flory Mfg. Co.
Cars, Dumping and Industrial
Good Rds. Mchy. Co., Inc.
Koppel Industrial Car & Equipment Co.
Carts, Concrete
Acme Road Mchy. Co.
Columbia Wagon & Body Co.
Ransome Concrete Mach. Co.
Castings
Burch Plow Works Co.
Republic Iron Works
South Bend Foundry Co.
U. S. Cast Iron Pipe & Foundry Co.
Caterpillar Tractors
Holt Mfg. Co., Inc.
Chutes, Concrete
Ransome Concrete Mach. Co.
U. S. Cast Iron Pipe & Foundry Co.
Clips, Rail, Forged
Sweet's Steel Co.
Concrete Block Machines
Republic Iron Works
Conduits (Creosoted)
Wyckoff Pipe & Creo. Co., Inc.
Cranes, Locomotive
Ball Engine Co.
Erie Steam Shovel Co.
Koehring Co.
Orton & Steinbrenner
Pawling & Harnischfeger Co.
Cranes and Hoists
S. Flory Mfg. Co.
Pawling & Harnischfeger Co.
Cross-Arms (Creosoted)
Wyckoff Pipe & Creo. Co., Inc.
Cross-Ties (Creosoted)
Wyckoff Pipe & Creo. Co., Inc.
Crushers
Acme Road Mchy. Co.
Good Rds. Mchy. Co., Inc.
Dinkeys
Koppel Industrial Car & Equipment Co.
Ditchers and Graders
Russell Grader Mfg. Co.
Drills
Ingersoll-Rand Co.
Schramm, Chris. D., & Son
Sullivan Mchy. Co.
Dump Bodies, Steel
Columbia Wagon & Body Co.
Heil Co., The
Mandt Body Co.
Dump Wagons
Acme Road Mchy. Co.
Austin-West. Rd. Mach. Co.
Good Rds. Mchy. Co., Inc.
Heil Co., The
Standard Steel Wks.
Tiffin Wagon Co.
Engines
Avery Co.
Flory Mfg. Co.
Schramm, Chris. D., & Son
Excavators
Ball Engine Co.
Blaw-Knox Co.
Erie Steam Shovel Co.
L. P. Green
Koehring Co.
Osgood Co.
Pawling & Harnischfeger Co.
Explosives
Atlas Powder Co.
E. I. du Pont de Nemours & Co.
Hammer Drills
Ingersoll-Rand Co.
Heaters, Asphalt & Tar
Connery & Co., Inc.
Farasey, J. D., Mfg. Co.
Honhorst, Jos., Co.
Hoists
Ingersoll-Rand Co.
S. Flory Mfg. Co.
Pawling & Harnischfeger Co.
Schramm, Chris. D., & Son
Hoists, Hydraulic and Hand for Motor Trucks
Heil Co.
Hose
Goodyear Tire & Rubber Co.
Jacks, Lifting
The Duff Mfg. Co.
Kettles, Asphalt & Tar
Connery & Co., Inc.
Honhorst, Jos., Co.
Loading Machines
Conant Machine Co.
Lumber (Creosoted)
Wyckoff Pipe & Creo. Co., Inc.
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Truscon Steel Co.
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Koehring Co.
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Picks
Wyoming Shovel Works
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Wyckoff Pipe & Creo. Co., Inc.
Plain Splice Bars
Sweet's Steel Co.
Plows
Avery Co.
Burch Plow Works Co.
Russell Grader Mfg. Co.
Wiard Plow Co.
Pneumatic Concrete Mixers and Placers
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Pneumatic Tools
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Pumps
Aurora Pump & Mfg. Co.
Emerson Pump & Valve Co.
Ingersoll-Rand Co.
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Rails, Light and Heavy Steel
Sweet's Steel Co.
Reinforcing Steel
Truscon Steel Co.
Rock Drills
Ingersoll-Rand Co.
Sharpeners
Ingersoll-Rand Co.
Shovels
Wyoming Shovel Works
Snow Removal Outfits
Avery Co.
Holt Mfg. Co., Inc.
Russell Grader Mfg. Co.
Spikes, Railroad
Sweet's Steel Co.
Standard Steel Buildings
Truscon Steel Co.
Steam Shovels
Ball Engine Co.
Erie Steam Shovel Co.
Switches
Koppel Industrial Car & Equipment Co.
Steel Cross Ties
Sweet's Steel Co.
Tires
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Track
Koppel Industrial Car & Equipment Co.
Sweet's Steel Co.
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Detroit Trailer Co.
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Turn Tables
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American-La France Fire Engine Co.

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Heil Co.
Transits and Levels
F. Weber Co.

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Good Rds. Mchy. Co., Inc.
Russell Grader Mfg. Co.
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Schramm, Chris. D., & Son
Sullivan Mchy. Co.
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Avery Co.
Buffalo-Springfield Rol. Co.
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Austin-West. Rd. Mach. Co.
L. P. Green
Good Rds. Mchy. Co., Inc.
Root Spring Scraper Co.
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Heltzel Steel Form & Iron Works
Standard Steel Works
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Standard Oil Co., (N. Y.)
Texas Co.
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Barrett Co., The
Standard Oil Co. (Ind.)
Standard Oil Co., (N. Y.)
Texas Co.
Bituminous Pavements
Barrett Co., The
Texas Co.
Warren Bros. Co.
Contraction Joints
Truscon Steel Co.
Creosoted Wood Block
Republic Creo. Co.
Wyckoff Pipe & Creo. Co., Inc
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Newport Culvert Co.
Curb Bars
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Philip Carey Co.
Servicised Products Co
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Fluxing Asphaltums
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Oil (Roads)
Barrett Co., The
Headley Good Roads Co.
Standard Oil Co. (Ind.)
Standard Oil Co. (N. Y.)
Texas Co.
Paving Fillers
Standard Oil Co. (Ind.)
Reinforcing Mesh
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Robinson Clay Prod. Co.
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Nat'l Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Fdry. Co.
R. D. Wood & Co.
Pipe Cleaning Machines
W. H. Stewart
Pipe (Reinfr. Concrete)
Independent Con. Pipe Co.
Pumps
Aurora Pump & Mfg. Co.
Segment Block Sewer
Robinson Clay Prod. Co.
Sewage Disposal Apparatus
Pacific Flush-Tank Co.
Sewage Disposal Plants
Sanitation Corporation
Sewage Disinfection
Electro Bleaching Gas Co.
Sewage Ejectors
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Sewer Joint Compounds
Pacific Flush-Tank Co.
Rods
The F. Bissell Co.
W. H. Stewart
Vitrified Fire Clay Sewer Tiles
East Ohio Sewer Pipe Co.
Robinson Clay Prod. Co.
Vitrified Sewer Pipe
Ohio Vitrified Pipe Co.
Robinson Clay Prod. Co.

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Cummer & Son, F. D.	21
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Davis, B. H.	24
Dee, Wm. E., Co.	—
Detroit Trailer Co.	5
Dixon, Jos., Crucible Co.	—
Dow & Smith	24
Duff Mfg. Co., The	—
Du Pont de Nemours Co., E. I.	—
E	
East Jersey Pipe Co.	—
East Ohio Sewer Pipe Co.	25
Electro Bleaching Gas Co.	19
Emerson Pump & Valve Co.	—
Erie Steam Shovel Co.	4
F	
Farasey, J. D., Mfg. Co.	—
Flory Mfg. Co., S.	—
Fraizier Ellms-Sheal Co.	24
G	
Gamon Meter Co.	8
Good Road Machinery Co.	—
Goodyear Tire & Rubber Co.	27
Granite Paving Block Mfrs. Assn.	—
Green, L. P., Co.	—
H	
Hansen, A. E.	24
Hazen, Whipple & Fuller	24
Headley Good Roads Co.	4
Heil Company	7
Heltzel Steel Form & Iron Co.	—
Hetherington & Berner	4, 6
Hersey Mfg. Co.	15
Hill & Ferguson	24
Holt Mfg. Co., Inc.	3
Honhorst Co., The Jos.	—
I	
Independent Concrete Pipe Co.	21
Ingersoll-Rand Co.	—
Ingram-Richardson Mfg. Co.	15
J	
Jaeger Machine Co.	5
K	
Kinney Mfg. Co.	15
Koehring Company	—
Koppel Industrial Car & Equipment Co.	—
L	
Loper Fire Alarm Co.	21
M	
Maclachlan Reduction Process Co., Inc.	24
Marine Metal & Supply Co.	23
Mueller Mfg. Co.	—
N	
Nat'l Cast Iron Pipe Co.	19
Nat'l Moulding Press Corp.	—
Nat'l Water Main Cleaning Co.	19
Newport Culvert Co.	—
New York Continental Jewel Filtration Co.	19
Norwood Engineering Co.	19
O	
Ohio Municipal Equipment Co.	21
Ohio Vitrified Pipe Co.	17
Orton & Steinbrenner Co.	4
P	
Pawling & Harnischfeger Co.	—
Penn. Salt Mfg. Co.	—
Pittsburgh Meter Co.	15
Pollock, Clarence D.	24
Potter, Alexander	24
R	
Ransome Concrete Mach. Co.	—
Republic Iron Works	—
Robinson Clay Product Co.	17
Ruberoid Co.	
Russell Grader Mfg. Co.	
S	
Sanitation Corporation	
Schramm, Inc.	
Servicised Products Co.	
Skinner, Frank W.	
Smith, A. P., Mfg. Co., The	
South Bend Foundry Co.	
Stacy-Bates Co.	
Standard Oil of Indiana	
Standard Oil Co. (N. Y.)	
Sterling Eng. Co.	
Stewart, W. H.	
Stumpf Una-Flow Engine Co.	
Sullivan Mach. Co.	
Sweet's Steel Co.	
T	
Texas Co.	
The Martinique	
Thomson Meter Co.	
Tiffin Wagon Co.	
Truscon Steel Co.	
U	
Union Water Meter Co.	
U. S. Cast Iron Pipe & Fdy. Co.	
Universal Road Mach. Co.	
V	
Vulcan Incinerator Co.	
W	
Warren Bros. Co.	
Weber, F., Co.	
Western Structural Co.	
Wiard Plow Co.	
Wood, R. D., & Co.	
Wyckoff Pipe & Creo. Co., Inc.	
Wyckoff & Son Co., A.	

BUYERS' CLASSIFIED DIRECTORY
(CONTINUED)

STREET CLEANING AND REFUSE DISPOSAL

Ash Bodies
Heil Co.

Carts
Acme Road Mchy. Co.
Columbia Wagon & Body Co
Tiffin Wagon Co.

Garbage Bodies, Steel
Columbia Wagon & Body Co.
Heil Co., The

Manholes—Catch Basins
Burch Plow Works Co.
Wm. E. Dee Co.
South Bend Foundry Co.

Incinerators
Stacy-Bates Co.
Vulcan Incinerator Co.

Shovels
Wyoming Shovel Works

Sprinkling Wagons and Flushers
Austin-West. Rd. Mach. Co.
Good Rds. Mchy. Co., Inc.
The Kinney Mfg. Co.
Tiffin Wagon Co.

Street Flushing Hose
Goodyear Tire & Rubber Co.

Street Sweepers
Austin-West. Rd. Mach. Co.
Ohio Municipal Equip. Co.

STREET SIGNS
Ingram-Richardson Co.

WATER WORKS

Air Compressors
Ingersoll-Rand Co.
Schramm, Chris. D., & Son
Sullivan Machy. Co.

Air Lift
Ingersoll-Rand Co.

Brass Water Connection
Mueller, H., Mfg. Co.

Centrifugal Pumps
Aurora Pump & Mfg. Co.

Chloride of Lime
Penn Salt Mfg. Co.

Chlorine Liquid
Electro Bleaching Gas. Co.

Deep Well Drills
Ingersoll-Rand Co.

Deep Well Pumps
Aurora Pump & Mfg. Co.
Cook, A. D.
Ingersoll-Rand Co.

Disinfecting Chemicals
Electro Bleaching Gas Co.
Penn Salt Mfg. Co.

Filters
N. Y. Continental Jewel Filtration Co.

Filtration Plants
Norwood Engineering Co.

Filter Alum
Du Pont de Nemours Co.

Fire Hydrants
Clark Co., H. W.
R. D. Wood & Co.

Flap Valves
Coldwell-Wilcox Co.

Meters
Badger Meter Mfg. Co.
Clark Co., H. W.
Hersey Mfg. Co.
Pittsburgh Meter Co.
Thompson Meter Co.
Union Water Meter Co.

Meter Boxes
H. W. Clark Co.
Pittsburgh Meter Co.

Meter Testing Machines
H. W. Clark Co.
Mueller, H., Mfg. Co.
Pittsburgh Meter Co.

Pipe, Cast Iron
National Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Fdy. Co.

Pipe, Steel
East Jersey Pipe Co.

Pipe, Wood
A. Wyckoff & Son Co.
Wyckoff Pipe & Creo. Co., Inc.

Pumps
Aurora Pump & Mfg. Co.
H. W. Clark Co.
Cook, A. D.
Schramm, Chris. D., & Son
Sullivan Mchy. Co.

Pumping Engines
Schramm, Chris. D., & Son
Sterling Engine Co.

Screens for Wells
Cook, A. D.

Service Boxes
Mueller, H., Mfg. Co.

Shear Valves
Coldwell-Wilcox Co.

Sleeves and Valves
Mueller, H., Mfg. Co.
Smith, A. P., Mfg. Co.

Sluice Gates
Coldwell-Wilcox Co.

Sprinkling and Flushing Hydrants
Mueller, H., Mfg. Co.

Steel Stacks
Heil Co., The
Honhorst, Jos., Co.

Strainers
Cook, A. D.

Tanks
Farasey, J. D., Mfg. Co.
Heil Co., The
Honhorst, Jos., Co.

Tanks, Towers, Standpipes
Connery & Co., Inc.
Farasey, J. D., Mfg. Co.

Tapping Machines
Mueller, H., Mfg. Co.
Smith, A. P., Mfg. Co.

Tunnel Liner Plates
Truscon Steel Co.

Valves
Clark Co., H. W.
Mueller, H., Mfg. Co.

Water Main Cleaning
National Water Main Cleaning Co.

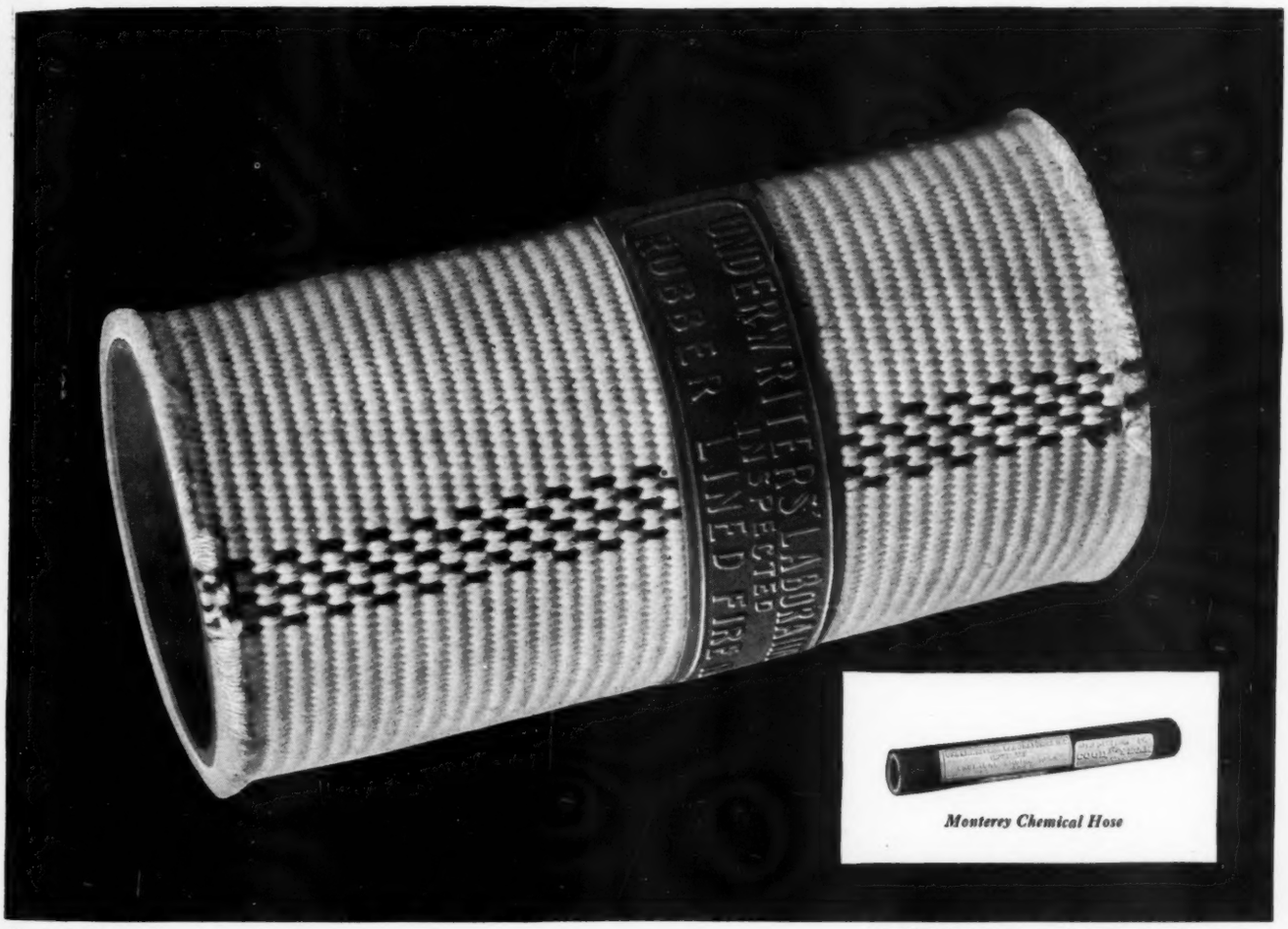
Water Purification
Electro Bleaching Gas Co.
N. Y. Continental Jewel Filtration Co.

Water Sterilization
Electro Bleach Gas Co.

Water Strainers
Mueller, H., Mfg. Co.

Water Supply from Well Systems
Cook, A. D.
Heil Co., The

GOODYEAR



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Through productive mining and lumbering regions;

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Close to the ocean where you catch occasional glimpses of splendid harbors and extensive shipping operations;

AND

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